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ORGAN OF
THE AMERICAN ASSOCIATION OF THE HISTORY OF MEDICINE
AND OF
THE JOHNS HOPKINS INSTITUTE OF THE HISTORY OF MEDICINE

Founded by HENRY E. SIGERIST

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JAMES THACHER

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CENTENNIALS IN THE MEDICAL HALL OF FAME

An Almanac of Anniversaries for 1954 A. D.

CLAUDIUS F. MAYER

Indocti discant et ament
meminisse periti (Hénault)

The general custom of returning celebration of various events is as old as the civilized world, and primitive tribes also have their memorial feasts. In family life the celebrations are usually called for by the births and the deaths in the kin, and commemorated at yearly intervals. In national life, or within very large groups of society, the celebrations of historical events can be less frequently repeated. Since biblical times we have had jubilees or fiftieth anniversaries, and since the ancient Romans we have had centenaries. The modern cult among professional people to recall their heroes to memory at fifty- and hundred-year intervals is a considerably recent outgrowth of the old system of national and religious festivals and hero-worship.

Medicine also has its Hall of Fame, its own sanctuary where the traditional images and statues of celebrities are kept in veneration, to be carried around in processions when the opportunity arises. The new year of 1954 brings its share of medical anniversaries, and it is my intention to turn the spotlight upon some of the most outstanding figures in the medical

sanctuary and to point to a few events in medical history, for guidance to the coming festivities.[1]

1204 Our listing of anniversaries for 1954 begins with events and men in the typical medieval year of 1204. The Fourth Crusade just ended, and Constantinople was plundered by the returning troops of Baldwin of Flanders, while in Rome the newly erected Holy Ghost Hospital opened its doors to the sick and poor. This hospital became the cradle of an order of hospitallers, and the paragon of many other hospitals of 13th century Europe. In the same year, Thomas of Cantimpré (d. 1280), Dominican monk, was born who collected the Aristotelian and other theories on Nature in his didactic and moralizing work *De naturis rerum*. Maimonides, or Moses ben Maimun, (b. 1135) died on 13 December, 1204, in Cairo where he was court physician to Saladin, and leader of the Jewish community. He wrote many Talmudic commentaries, philosophical, scientific, and medical works in which he created a Jewish system of scholasticism, thereby trying to reconcile Judaism with Aristotelian philosophy. He had great influence upon the Christian philosophers of the 13th century, including Albert the Great, St. Thomas, and Duns Scotus.

1454 The 13th, 14th and 15th centuries are important in the history of European universities and high schools. The studium generale of Sevilla was approved by Alfonso the Wise in 1254; the University of Huesca was established by Pedro IV in 1354, and the University of Turin was founded in 1404. The charter of the University of Freiburg i. B. was granted by Callistus III in 1454 though the school opened for instruction in 1460 only. Ermolao Barbaro (May 21, 1454-June 14, 1493), Venetian scholar and diplomate and later the Patriarch of Aquileja, was born this year; he is remembered as the castigator and commentator of the text of Pliny, and the translator of Dioscorides.

1554 The year 1554 of the high renaissance is mostly remembered for a few important publications of G. Rondelet (*Libri de piscibus marinis*), R. Dodoens (*Cruydeboeck*), and J. F. Fernel (*Medicina*). Probably the most popular book of that year was Jacob Rueff's (1500-58) *De conceptu et generatione hominis* (Zurich, 1554), an illustrated midwifery work which was translated into several languages and reprinted in many editions.

[1] For source material, appropriate references and additional bibliography see the corresponding biographical and subject entries in the volumes of the *Index-Catalogue of the Library of the Surgeon-General's Office* (Army Medical Library).

1604 The beginning of the 17th century and the year 1604 brought us a work of Johan Kepler (*Ad Vitellionem paralipomena*) in which he showed that vision is a function of the retina and the optical image is inversed upon the retinal surface. William Clowes (b. 1540), the greatest surgeon of Elizabethan England, died in that year. He was versed in war medicine and surgery, and served against the Armada in 1588. His work on gunshot wounds (*A proved practice for all young chirurgians*, etc., Lond., 1591) is of considerable historical value in the English medical literature. His book *A short and profitable treatise, touching the cure of the morbus gallicus by inunctions* (Lond., 1579) is the first English treatise on syphilis, written in an age when 15 out of 20 admissions to St. Bartholomew's Hospital were found to be venereal in nature. The same year gave birth to Johann Rudolf Glauber (d. 1668 or 1670), German chemist and physician whose name is perpetuated by the purgative Na_2SO_4 salt which he artificially prepared and described in his *Miraculum mundi* (Amsterdam, 1653-60).

1654 It was the year of 1654 when Charles Chauncy (1589-1571) was appointed the second President of Harvard College. A cross-section of the year would show a number of scholars, flourishing in various European countries, including Malpighi, Borelli, Bartholin, Harvey, Gassendi, Sydenham, etc. At the Reichstag in Regensburg, Otto Guericke (1602-86), German Physician, demonstrated his newly invented air-pump, and showed that sixteen horses could not pull apart the huge hemispheres of Magdeburg which were held together by atmospheric pressure and vacuum. In London, Francis Glisson (1597-1677) published his *Anatomia hepatis* (Lond., 1654) in which chapter 28 described the subperitoneal perihepatic layer referred to as the hepatic capsule.

Olaus Worm (b. 1588), Danish anatomist, finished life in 1654. His name is still remembered by the small accidental bones which he described along the suture lines of the skull and which Thomas Bartholinus (1616-80) called the Wormian bones. In Italy, Giammaria Lancisi (d. 1720) was born on October 26, 1654. He was one of the greatest Roman physicians, active first as a staff member of the Holy Ghost Hospital, later as professor, writer, and physician to several popes. He wrote on sudden death (1707), described the longitudinal striae on the dorsal surface of the corpus callosum (1711), edited the rediscovered copper plates (1714) which were originally made for an anatomical atlas of Bartolomeo Eustachi in 1552 but remained unpublished until Pope Clement XI presented them to Lancisi. In 1739 he described the syphilitic type of aneurysm of the

heart. But his chief merit in the eyes of posterity is that, almost two hundred years before the discovery of the Plasmodium (by Laveran in 1880), Lancisi suspected the true nature of malarial fevers. In his *De noxiis paludum effluviis eorumque remediis* (1717) he stated that certain living beings might enter the blood and produce the malarial sickness, though perhaps such a statement would seem to be more becoming to a poet than to a physician. He also suggested that for the discovery of such living beings the malarial patient's blood should be repeatedly studied under the microscope. And this method of hematological search resulted in the detection of the malarial parasite in the 19th century. Lancisi also proposed the drainage of swamps and marshes for the control, and the cinchona bark for the treatment of malaria.

1704 The beginning of the 18th century is characterized by the activities of such men as Leibniz, Newton, Nehemiah Grew, Friedrich Hoffmann, Boerhaave and others. In American history this year marks the birth of the first printed newspaper; this was the Boston News-Letter first issued on April 24, 1704, by B. Green. Newton published his treatise on optics, and Antonio Maria Valsalva described the ear in his treatise *De aure humana* (Bologna, 1704), subdividing the organ of hearing into the accepted three parts.

In 1704 died Jean Baptiste Denis, French physiologist who, on June 15, 1667, performed the first transfusion of lamb's blood into a young man which he described in *Lettre . . . touchant des expériences de transfusion faites sur des hommes* (Paris, 1667). It should be mentioned here that the first blood-transfusion from an animal to another was made by Francesco Folli (1624–85), Italian physician, on August 13, 1654.

Lorenzo Bellini (b. 1643), Italian anatomist, also died in 1704. He is remembered by his description of the renal tubules, once called Bellini's tubules (cf. his *De structura et usu renum*, Florence, 1662). He also recognized that the papillae of the tongue are the endings of the sensory organ of taste (*Gustus organum novissime deprehensum*, Bologna, 1665).

The year of 1704 gave birth in England to a man who started his professional career as a member of the Company of Barber-Surgeons of London and ended his life in 1790 as an anatomist of Philadelphia. He was Abraham Chovet, an artist in wax models and corrosion specimens of the human body. His migrations from England carried him to Barbadoes (1754), Kingston (1759), and to America (1774). He collected an anatomical museum, and in Philadelphia he built an amphitheater in 1777 for his lectures. His wax models were purchased in 1793 to form the

basis of the Museum of the University of Pennsylvania (they melted in the fire of 1888). For his merits the College of Physicians of Philadelphia made him one of its senior founders, though he was a foreigner. Chovet also wrote *A Syllabus or Index of all parts that enter the composition of the human body* (Lond., 1732).

1754 The next fifty-year step brings us to 1754 which was a very significant year in the history of American medicine. This was also the year when Gerard van Swieten (1700-72), Dutch physician of Maria Theresia, the Austrian Empress, succeeded in organizing clinical instruction in Wien and imported his friend, Anton de Haen (1704-76), to head the Clinical Institute of the University.

In America, William Hunter, immigrant physician (1752) and a graduate of Edinburgh, began to give lectures on anatomy at Newport, R. I.; these were perhaps the first lectures on medical subjects given in New England or in America. On 31 October, 1754, King's College was founded in New York, later (1784) known as Columbia College and, since 1896, Columbia University. Together with the college grew its library which is now one of the largest university libraries of the United States. The New York Society Library was also founded in 1754. The Philadelphia College was likewise established in the same year.

There are two eminent American physicians whose bicentennial birthday will be celebrated in 1954: James Thacher and Benjamin Waterhouse. Thacher is the dean of medical historians in the United States. He was born on February 14, 1754, at Barnstable, Mass., and studied medicine as an apprentice of the village doctor. During the American Revolutionary War he served as military surgeon under John Warren (1753-1815) the later founder of Harvard Medical School. Thacher retired from the Army in 1783, settled in Plymouth, Mass., and spent his time in practice and studies, in experimentation and writing. His deafness was perhaps a factor in his literary activities. Among his various publications there are two of lasting value to American history and medicine. One is his *Military Journal* (Boston, 1823), a day-by-day coverage of the events of eight years of the American Revolution. The other work is his *American Medical Biography* (Boston, 1828). He died on May 24, 1844.

Thacher's *American Medical Biography* includes 163 biographies in its two volumes on 716 pages, beginning with Samuel Adams (1751-88) and ending with James Woodhouse (1770-1809). Its motto, "Peace to their ashes, and the stamp of immortality on their memory," indicates that Thacher limited his work to the lives of the deceased. The first 85 pages

of the book (vol. 1) give " A Succinct history of medical science in the United States from the first settlement of the country " as indicated in its title. This part outlines the medical events in North America, state after state in a geographical order, starting with Massachusetts and proceeding toward South Carolina. The biographies are limited to simple facts since Thacher felt that they are the best eulogy. They come to an end on p. 222, to be followed by some notes, and an Appendix with additional memoirs of lives, an index, and a list of subscribers. Though Thacher wrote his medico-historical work with the assistance of G. C. Shattuck (1784-1854) and other prominent men of his days, it remains a " perpetual monument " (Spalding) to his fame.

Benjamin Waterhouse (March 4, 1754-Oct. 2, 1846) was another New Englander by birth who is remembered as the man who introduced and popularized the Jenner method of cowpox vaccination against smallpox in the United States. Though he also began his medical education as an apprentice of a Newport, R. I., physician, he continued his studies in Europe where he spent the years of the American Revolution from 1775 to June 1782 in medical studies at Edinburgh and at the University of Leiden, the most famous medical school of those days. When he returned to America in 1782 as a graduate of Leiden University, he was probably the best educated physician on this side of the Atlantic. No wonder that John Warren, who was requested by the Harvard College Corporation in the same year to organize a medical school, chose Waterhouse to become the professor of the theory and practice of " physic."

His efforts in 1799 and the subsequent years resulted in the acceptance of the Jennerian preventive inoculations by the American medical profession of the beginning 19th century. After the receipt of a copy of Jenner's *Inquiry* (published 1798) he immediately published a short notice about it in a Boston paper, and followed it up with additional articles and lectures in order to propagate the knowledge of vaccination. He received vaccine virus from England in 1800, and inoculated several members of his own family as well as others near and far. In August 1802, he organized a public cross experiment under the supervision of the Boston Board of Health where the protective power of the cowpox inoculations was again demonstrated. Benjamin Waterhouse was not liked by his contemporaries, and it took the efforts of William Welch to make him accepted as " the Jenner of America " (1885).

1804 Our search for anniversaries brings us to 1804, the year when Napoleon became the Emperor of France. The year is characterized by

the activities of such men as Lamarck, Cuvier, Humboldt, Gall, Lorenz Oken, Berzelius, Charles Bell, Sprengel, Fichte, Hegel, and Goethe. In the same year Dr. John Cunningham Saunders (1773-1810) founded the Royal London Ophthalmic Hospital. In Russia, the universities of Kazan and Kharkov were established. In Baltimore, John B. Davidge started a course of lectures on midwifery to a class of six students, which was the beginning of the College of Medicine of Maryland (formally organized by the State in 1807). The bookmarket received the first rhinological work from the pen of Jacques Louis Deschamps who published his *Dissertation sur les maladies des fosses nasales et de leurs sinus* as a graduation thesis (Paris, 1804).

The entire world suffered a loss by the death of Emanuel Kant (1724-1804), the Königsberg philosopher, who, with his *Kritik der reinen Vernunft* (1781) opened a new era in human development. He introduced a new system of thought which provided the critical basis for the development in 19th century science, and defined the limitations of human knowledge. Joseph Priestley (b. 1733), English clergyman and discoverer of oxygen (1774), also died in 1804 in America where he had immigrated. John Richardson Young (1782-1804) met his tragic death in the same year, one year after he published his graduation thesis *An experimental inquiry into the principles of nutrition and the digestive process* in which he demonstrated the role of gastric juice in the digestion of the bull-frog.

The current year 1954, brings the sesquicentennial birthday of many foreign and American physicians and scholars of distinction. Sir Richard Owen (d. 1892), English anatomist and paleontologist, produced many important works and edited various journals of his specialty. Jonathan Pereira (d. 1853) was professor of materia medica at the Pharmacy School in London and wrote the first great English work in this subject (*The elements of materia medica*, 2 vols. Lond., 1839-40). Carl Rokitansky (d. 1878) was professor of pathology in Wien from 1844 to 1874, and became one of the most important figures in the history of modern pathology. He described acute yellow atrophy of the liver (1843), spondylolisthesis (1839), and many pathological conditions of the heart and the lung, including the defects in the cardiac septum (1875). Matthias Joseph Schleiden (d. 1881), professor of botany at various German universities, became one of the founders of the cellular theory of life (*Beiträge zur Phytogenesis*, 1838).

Karl Theodor Ernst v. Siebold (d. 1885), son of the famous obstetrician, was active as a medical practitioner and professor of zoology at

several German universities. His articles contributed much to the field of comparative anatomy and the biology of invertebrates (*Lehrbuch der vergleichenden Anatomie*, 2 vols. Berlin, 1846-48). William Stokes (d. 1878) was an important member of the Irish school of cardiologists who developed in 19th century Dublin. Stokes provided many details of the heart block which was described by Adams in 1826 (rept. 1827). His *Diseases of the heart and the aorta* was published in 1854.

In the United States, Elisha Bartlett (d. 1855), professor of various medical specialties at a number of American universities, was born on October 6, 1804. Among his different writings those on the logical and philosophical aspects of medicine are of the most lasting value (*An essay on the philosophy of medicine*, 1844; *An inquiry into the degree of certainty in medicine*, 1848). The life of John Fonerden (d. 1869). Baltimore physician and friend of Johns Hopkins, is of special interest to the City of Baltimore, the Medical Society of Maryland, and to the Johns Hopkins Hospital and University, because in his lifetime he often pointed out the need for a city hospital and a university.

Other eminent physicians who were born in 1804 were Georg F. Ludwig Stromeyer (d. 1876), the father of modern military surgery (*Maximen der Kriegsheilkunst*, 1855); Josiah Clark Nott (d. 1873), of Columbia, S. C., who was one of the earliest to believe in the insect origin of yellow fever (1848); Peter Parker (d. 1888), who became the first American missionary physician and opened an eye infirmary in Kanton for the poor, also established the Medical Missionary Society in China.

1854 The events of 1854 are still of great importance in our present life, and medically interesting data could be easily extracted from contemporary medical periodicals such as the *British Medical Journal*, the *Lancet*, the *Gazette des Hôpitaux*, the *New York Journal of Medicine*, and others. It is in the 18th year of the Victorian era when a book written for the enlightenment of young English ladies on *Female Physiology* (Lond., 1854) called down all the power of the *Lancet* upon the head of its poor author, Dr. Thomas J. Stuart, member of the Royal College of Surgeons and fellow of the Medical and Microscopical Societies of London. The same blushing era did not see, however, anything objectionable when, at the request of the English Secretary of War, Miss Florence Nightingale and 37 other young women volunteered as nurses to care for the wounded in the war of the allied western forces against Russia. The Crimean War of 1854-56 was the continuation of an armed conflict which started in 1853 to settle the problem of protectorate over the Eastern Christians. It as-

sumed European proportions after both England and France declared war against Russia. The contemporary journals and medical magazines devoted special columns for the news which came by telegraph *via* Trieste. This war also provided the pathetic story of a sort of "United Nations" campaign conducted under the most primitive sanitary conditions, with lack of medical supplies and of trained surgeons and nurses, and with recklessness in preserving life.

For several American medical schools the year 1854 is of historical significance. The Atlanta Medical College changed into Emory University School of Medicine, the Iowa College of Physicians and Surgeons became the University of Iowa Medical Department, and the Medical College of Virginia (organized 1838) assumed its present name. In Canada, the Queen's University Faculty of Medicine was established at Kingston, Ont. In London, the St. Mary's Hospital Medical School opened for instruction. In the same year, Dr. Benjamin Constant founded the Institute for Blind Children in Rio de Janeiro. On January 9, 1854, the Astor Library in New York City opened its doors to the public, owing to the generosity of John Jacob Astor (1763-1848), German immigrant.

The outstanding books of the year were earlier publications of Magnus Hus on chronic alcoholism (1849), of Morel on mental alienation, and of Vidal on the treatment of venereal diseases (1852). They received some of the 1854 prizes of the French Academy of Sciences. Several medical inventions and discoveries were made or described in 1854. Karl Vierordt (1818-84) invented the sphygmograph, and in September of the same year Manuel García, a teacher of singing in London, saw his vocal cords in function by means of a modified dentist's mirror which he placed against his uvula; he reported his observations to the Royal Society next year. Rudolf Virchow discovered myelin and neuroglia, and the physiologist Hermann Welcker made the first studies on blood volume in experimental animals. The method of galvanocaustics was introduced by Albrecht T. Middledorpf (*Die Galvanokaustik*, Breslau, 1854), and Pirogov described his osteoplastic amputation at the ankle (a modified Syme). Graefe suggested iridectomy for the treatment of glaucoma in his *Archiv für Ophthalmologie* which he founded and started in 1854. A very interesting practical trend began to develop in surgery, viz. the use of refrigeration for local anesthesia (Velpeau, Arnott, and others). In the same year Mathieu, the French instrument-maker, suggested the production of cold by means of evaporating ether. It was also in 1854 that Louis Daniel Beauperthuy (1807-71), physician and naturalist in Caracas, Venezuela, wrote that

malaria and yellow fever are caused by living germs (" vegeto-animal virus ") which are transmitted by " tipular insects " (biting mosquitoes).

There is a long list of well-known scientists and physicians who died a hundred years ago. Carl Adolph Basedow (b. 1799), physician of Merseburg, described goiter, exophthalmos, and tachycardia (the so-called Merseburg triad) in 1840 (Graves published his work on thyrotoxicosis in 1835), and his name became synonymous with exophthalmic goiter in the German-speaking countries of Europe. Friedrich Wilhelm Joseph Schelling (b. 1775), philosopher, became the father of " Naturphilosophie " (*Ideen zu einer Philosophie der Natur*, 1797), a system of fantastic speculation and ideology which tried to derive the world of Nature from the world of spirit, and permeated the medicine of the early 19th century. Philibert Joseph Roux (b. 1780), the rival of Dupuytren in Paris, and the American George Cheyne Shattuck (b. 1784), the collaborator of Thacher and one of the founders of the *New England Medical Journal* also died in 1854.

Centennial birthday celebrations also will be numerous in 1954, and many of these distinguished scholars and physicians were perhaps part of the life of the present medical generation. Victor Babès (d. 1926), the discoverer of the protozoon (" Babesia ") of epizootic hemoglobinuria of cattle, was pathologist and bacteriologist at various European universities, and introduced many reforms in the sanitation and medical education system of Romania. Carl Magnus Fürst (d. 1935) was known as a Swedish anthropologist and medical historian (*Anthropologia Suecica*, Stockholm. 1902). The French Ernest Gaucher (d. 1918), professor of dermatology, will be remembered by his doctoral dissertation (1882: *Epithélioma primitif de la rate*) which contains the first description of the familial splenic type of anemia (" Gaucher's disease "). The Italian Giambattista Grassi (d. 1925) confirmed the work of Laveran on the malaria Plasmodium (1891) and demonstrated its sexual cycle in the Anopheles mosquito (1899). The German Hermann Albert Dietrich Lenhartz (d. 1910) is best remembered for his article on the diagnostic and therapeutic value of lumbar puncture (1896) and his method of treating gastric ulcer (1904). Other centennial birthdays will be celebrated for Felix v. Luschan (d. 1924), German anthropologist and ethnologist, Sir Donald MacAllister (d. 1934), former chairman of the British Pharmaceutical Council, and Chancellor of the University of Glasgow, also for Jules Henri Poincaré (d. 1912), mathematician and philosopher of science, and Kristian L. J. Poulsen (d. 1931), professor of surgery in Denmark.

In America, all the milk commissions and welfare agencies for infants will commemorate the 1854 (March 16) birthday of Henry Leber Coit, Newark pediatrician whose merit lies in devising the system of such commissions (1893) and the introduction of certified milk for infant feeding (1912). William Thomas Councilman (d. 1933) will be recalled to memory by all parasitologists for his work on amebic dysentery (1890). William Crawford Gorgas (Oct. 3, 1854-July 4, 1920), military surgeon and Surgeon General (1914-18) of the U. S. Army, and James Carroll (June 5, 1854- Sept. 16, 1907) are the most outstanding figures in the 1954 harvest of American medical anniversaries. Carroll was a member of the Army Medical Commission which was appointed, in 1890, under the command of Major Walter Reed, to investigate the yellow fever which appeared among the American troops stationed in Cuba. In order to test the mosquito theory of transmission which was maintained at that time by Carlos J. Finlay (1833-1915), Cuban ophthalmologist, Carroll let himself be bitten on August 27, 1900, by a Stegomyia mosquito which was bred from eggs by the Commission's entomologist, J. W. Lazear, and fed on blood of yellow-fever patients. Further experiments of the Reed Commission on human volunteers proved the vector role of mosquitoes in the spread of the disease, and other experiments of Carroll in 1901 showed the filterable nature of yellow-fever virus and its presence in the blood of the sick. The findings of the Army Commission in 1900-1901 showed the way for Gorgas, who became the chief sanitary officer of occupied Havana in 1898, how to control and to eradicate yellow fever at his station. There were billions of mosquitoes, but, by studying their breeding habits, Gorgas was able to discover the value of petroleum poured over stagnant waters. He started his clean-up campaign in March, 1901, and made the city free of yellow-fever by the end of September of the same year. He gained such a reputation in the world by his achievement in Cuba, that he was also sent to unhealthy Panama where his sanitary work made the building of the Canal possible. Thereafter he became a consultant whenever or wherever an endemic disease devastated the native population of the less civilized regions of the world. One of his biographers (J. M. Gibson, 1950) aptly named him a " physician to the World."

The centenaries of the birth of Emil Adolf Behring, the discoverer of serotherapy, and of Paul Ehrlich, the discoverer of chemotherapy and of salvarsan, will be celebrated all over the world. Both were of German origin and of German education. Their studies complement each other, and their lives often came in contact, not in a very happy way. Both were

born in the month of March, just a few days apart: Behring on March 11, in a typical West-Prussian village, to a typical Prussian family of school teachers and farmers; Ehrlich on March 14, in a German-Silesian village near Breslau, where his father was the Jewish innkeeper of the " Krug zum Rautenkranz." Both received the Nobel Prize: Behring first, in 1901, when the prize was first distributed; Ehrlich later, in 1908, but he had to share it with Elia Mechnikov. Ehrlich died first, on August 20, 1915, from apoplexy; Behring later on March 31, 1917, from pneumonia. Both studied and worked in Berlin under Robert Koch (about 1890), and both became the founders of important therapeutic institutions: Ehrlich in 1906 when, with the wealth of Franziska Speyer, he established the Georg-Speyer Haus for Chemotherapie in Frankfurt a.M.; Behring in 1914, when his private laboratories (established 1895) became the Behringwerke in Marburg.

Behring wanted to be a protestant minister but his childhood plans changed and he entered upon the career of a Prussian military medical officer in 1874, graduated in 1878, and served at various military posts. During this time he studied bacteriology and antisepsis; then, in 1889, he was attached to the Berlin Hygienic Institute, together with other military colleagues. Here, in 1890, he made his fundamental observations on diphtheria and tetanus and, with the collaboration of Kitasato, discovered the antitoxins of these infectious diseases and their role in immunity. In 1891, at Christmas time, he began the experimental use of diphtheria immune serum at the clinics of Berlin and of other cities. From 1894 on, serotherapeutic institutes were established everywhere in the larger cities.

Ehrlich was under the influence of Karl Weigert, a maternal uncle, when he decided for a medical career. Like Weigert, he also was a histopathologist in the first period of his studies when his investigation of the staining technic enabled him to better understand the mechanism of histochemical reactions and to make various hematological discoveries (e. g., aplastic anemia, 1886). After spending a year and a half in Egypt for the cure of his pulmonary tuberculosis, he returned to Berlin in 1890 where, under Koch's patronage, he devoted most of his time to elaboration of a theory of immunity and serotherapy. His experiments with measureable plant toxins gradually led him to a quantitative method by which a standardization of immune sera against bacterial toxins became possible. His theoretical explanation of the interaction between toxin and antitoxin is known as the side-chain theory, and it became a fundamental law of modern immunology.

During this " diphtheria " period of his life Ehrlich was made director of the State Institute of Serology and Serum Testing (1896). As such he received many unwarranted demands from Behring who wanted to have all experiments with his sera done at the expense of the State. Later, Behring requested that the State Institute should check and control all the immune sera, which he manufactured, without charge. At this time, in a 14-page letter, Ehrlich wrote to his superiors on November 1, 1906: " I have an utter dread of a real collaboration with von Behring. In the diphtheria period, reported above, there was a constant scientific struggle between us. . . . There is . . . no valid reason for von Behring's demand " (Marquardt, M.: *Paul Ehrlich.* Lond., 1949, p. 37).

It was in the third and last period of his life and research that Ehrlich combined his knowledge of histological stains and of immunity reactions to pursue his conception of a " therapia sterilisans magna " which would kill the bacteria without harming the human body. His experiments with various arsenicals founded the modern chemotherapy, and also produced an effective remedy against spirochetal diseases. The " 606," later called salvarsan and arsphenamine, carried the name of Ehrlich (and of his collaborator, Hata) all over the world.

1904 The events which happened fifty years ago are within the span of our own lives. World history recorded the year 1904 as the beginning of the Russo-Japanese War which started for the possession of Manchuria and Korea. In the history of science and medicine it stands as the foundation year of the University of Leeds, of the Rhodes University in South Africa, of the American Academy of Arts and Letters (N. Y.), the National Tuberculosis Association and the American Trudeau Society, and of the Department of Genetics of the Carnegie Institution of Washington. Various medical periodicals were founded in 1904, such as the *Avenir Médical* in Paris and the *Antiseptic* in Madras, India.

There were many new medical inventions and discoveries made which are still parts of our diagnostic and therapeutic armamentarium. It is difficult to select those of the highest value. Sharpey-Schäfer proposed a new method of artificial respiration, and Sauerbruch introduced his negative-pressure chamber to facilitate thoracic surgery. Emil Fischer and Joseph Mering prepared veronal synthetically while Max Cloetta introduced his digalen. Fifty years ago the medical profession became acquainted with bacteriotropins (Neufeld-Rimpau), fatigue toxins (Weichardt), the Gradenigo syndrome, Atwater's respiration calorimeter, the

use of blood-picture for diagnosis (Arneth), the rheumatic nodules in the myocardium (Aschoff), etc.

Among the deceased of 1904 there were Karl Weigert (b. 1845), the histologist uncle of Ehrlich; Sir Henry Thompson (b. 1820), urologist of Leopold I and Napoleon III; Max Bartels (b. 1843), who left us his excellent description of the medicine of primitive people; Etienne Jules Marey (b. 1830), French physiologist, who provided us with many laboratory apparatus and first used serial photographs for the analysis of movement (1894); Georges Gilles de la Tourette (b. 1857), French neurologist, the describer of a peculiar type of motor incoordination (1884); Niels Ryberg Finsen (b. 1860), Danish physician, who introduced the ultraviolet lamp and, in 1903, received the Nobel prize for his treatment of lupus vulgaris with concentrated light rays; also Paul Tannery (b. 1843), French mathematician, and one of the earliest and greatest historians of science.

Here, our search for anniversaries in the sanctuary of medicine comes to an end, and our brief medico-historical almanac for 1954 is completed. Let us close the door of the Hall of Fame with the motto of Thacher's Medical Biography: "Peace to their ashes, and the stamp of immortality on their memory."

CÆCILIUS FOLIUS ON THE CIRCULATION

G. KASTEN TALLMADGE

Cæcilius Folius (Cecilio Folli) was born in 1615 in Modena, in or near the village of Frignano. Biographical data are excessively sparse, and what few have come to hand are occasionally erroneous and usually contradictory. Nevertheless, comparison of these data with certain personal passages in his writings, and both of these with certain known facts about his contemporaries, enables one to formulate a tolerably probable account.

Before Cæcilius was born his father was slain in battle. The lad was brought up by an uncle, Giambattista Folius, a member of the Council of Health of the city of Venice. He had his preliminary education at Venice [1] and then proceeded to the University of Padua where in due course he was admitted to the doctorate in medicine. He had studied under Vesling of Minden, who during these years was professor of anatomy and botany at Padua. Vesling was about thirty seven years of age while Folius was his student.

Having received his doctor's degree Folius went to Venice, where he would enjoy the patronage of his uncle, who in turn was in the favor of the Doge, Francesco Erizzo.[2] Whatever hopes Folius may have held were not disappointed: he was made a Venetian knight and then elevated to the rank of professor of anatomy in the University of Venice.

He is known to have written three works, but the single one of these which brought him such renown as he ever enjoyed was his "New Delineation of the Internal Ear," [3] an opuscule of six fairly well executed plates with a brief explanatory text for each, and said to have been the most nearly accurate description of the inner ear up to its time. More than a hundred years later Antoine Portal said of it, "This is the manner in which judicious and perspicuous spirits know how to describe in a few

[1] Or, according to a source less probable, at Modena. As a matter of fact, only three sources are worth considering: 1, the works of Folius himself; 2, the *Biographie Médicale* (*Dictionnaire des Sciences Médicales*, Paris, 1821), *s. n.* Folli (Cécile); and 3, the *Enciclopedia Italiana*, which adds almost nothing. The *Biographisches Lexikon hervorragender Aerzte* (2nd ed., Berlin, 1930), which offers only an abbreviation of the account in *Biographie Médicale*, commits the incredible blunder of confounding Vesling with Vesalius!

[2] Or, according to Folius himself, "Erizzio."

[3] *Nova Auris Internæ Delineatio*, Venice, 1645, 4to. I have been unable to verify a supposed Venetian edition of 1639, and a Frankfurt duodecimo edition of 1641.

words the most complicated objects and how to explain the most interesting discoveries. If everyone had followed the method of Folius there would be fewer books but just as much positive knowledge." [4] It has been said that Vesling used Folius' drawings and description in his own *Syntagma Anatomicum*, published from Padua in 1641, a date at which Folius would be twenty six years of age. But Vesling nowhere acknowledged any debt, and the name of Folius is conspicuously absent from the rather long list of anatomists mentioned in Vesling's *Syntagma*.[5]

Folius is said to have died in Venice, thirty five years old, in 1650. But there is extant a letter, "Cæcilius Folius to Alcidio," concerning the lacteals, dated December 19, 1653;[6] this is the last biographical datum known to exist.

At present we are not concerned with the "New Delineation of the Internal Ear." But we are concerned with a monograph which Folius entitled "An Accurate Delineation of the Way of the Flowing of the Blood from the Right into the Left Ventricle of the Heart." This work is known also under the title, "An Easy Way Revealed for the Flowing of the Blood from the Right into the Left Ventricle of the Heart, to Which is Prefixed an Uncommon Animadversion upon the Recently Discovered Lacteal Veins." [7] The single copy of this monograph which I have been able to locate in fifteen years of searching is in the Armed Forces' Medical Library;[8] in this edition it forms part of a tetralogy, so to speak, published in Leyden in 1723. The title of this tetralogy reads as follows: "A Fascicle of Four Distinguished Anatomical Opuscules, in Which Are Included, First, an Epistolary Dissertation of the New Lacrimal Ducts, by Giambattista Bianchi; Second, a Demonstration of a New Salivary

[4] C'est ainsi que les esprits judicieux et clairvoyans savent décrire en peu de mots les objets les plus compliqués, et faire part des découvertes les plus intéressants. Si l'on eût suivi la méthode de Folli, on eût eu moins de volumes, et non pas moins de connaissances positives. *Histoire de l'Anatomie et de la Chirurgie*, Paris, 1770.

[5] It has been said also that Vesling used Folius' description of the heart for his *Syntagma*, but a comparison of the texts reveals that this is false. Moreover, Vesling had clear concepts of the atria, the auricles, the ventricles, and the valves, at least by 1641, when the *Syntagma* was published. But in 1639, as will appear from the sequel, Folius had only confused notions of the atria and the valves. Again, he denied the circulation of the blood which Vesling defended.

[6] De Renzi, S.: *Storia della Medicina in Italia*, Naples, 1845-49.

[7] SANGUINIS A DEXTRO *In Sinistrum Cordis Ventriculum Defluentis* FACILIS REPERTA VIA, *CUI NON VULGARIS IN Lacteas nuper patefactas Venas animadversio præponitur.* AUCTORE CÆCILIO FOLIO Fananensi Philosopho, Medico, atque in Inclyta Venetiarum Urbe publice Anatomen profitente.

[8] Surgeon General's Library, no. 112352.

Gland Emptying on the Tongue, of Abraham Vater; Third, an Erudite Epistle of Heinrich Meibom on New Vessels in the Eyelids; and Fourth, an Accurate Delineation of the Way of the Flowing of the Blood from the Right into the Left Ventricle of the Heart, of Cæcilius Foilus." [9]

The date of publication of the "Fascicle" might lead one to wonder whether antagonism to the doctrine of the circulation of the blood were still rife ninety five years after the publication of Harvey's book. It seems more probable, however, that the Verbeek brothers of Leyden, whose business it was to publish books, merely put forth this rather modest volume as a trade routine and without caring too much what went into its composition. The dates of Folius are 1615-1654 (?); of Meibom, 1638-1700; of Vater, 1684-1751; and of Bianchi, 1681-1761. Folius is thus the eldest of the four by far: he had died some seventy years before this edition of his work was published; and of the four authors only Vater and Bianchi were still living at its appearance.

Folius' small work, consisting of thirty pages augmented by a preface and two drawings, was dedicated to Francesco Erizzo,[9a] who was born in 1565 and became Doge in 1631. He had bestowed "many honors and innumerable benefits upon me, upon my uncle Giambattista, and upon our whole family." We are told that this is the author's first work and was written when he was twenty four years old. The dedication itself is composed in the usual manner of fulsome adulation: Folius lays his little book at the feet of the great Doge, just as the ancients used to place garlands at the feet of their gods, to be a memorial of the writer's everlasting homage. He ends his eulogy with the valedictory, "Be well and live long, O better than Trajan, more fortunate than Augustus." [10]

We are not concerned here with the "Uncommon Animadversion upon the Recently Discovered Lacteal Veins." These vessels usually are said to have been discovered in 1622 by Gaspare Aselli, but they had been known to the physicians of ancient Greece and also apparently to Fallopius and Eustachius, and perhaps to others as well.

[9] QUATUOR LUCULENTORUM OPUSCULORUM ANATOMICORUM *FASCICULUS.* QUO I. JOANNIS BAPTISTÆ BIANCHI Ductuum Lacrymalium Novorum *EPISTOLARIS DISSERTATIO;* II. ABRAHAMI VATERI Novi Ductus Salivalis in Lingua Excretorii *DEMONSTRATIO;* III, HENRICI MEIBOMII De Vasis Palpebrarum Novis *ERUDITA EPISTOLA;* IV, CÆCILII FOLII Viæ Sanguinis a Dextro in Sinistrum Cordis Ventriculum defluentis *ACCURATA DELINEATIO;* COMPREHENDUNTUR. *Editio Novissima, Figuris Æneis adornata, seduloque recognita. LUGDUNI BATAVORUM* Apud JOH. & HERM. VERBEEK, MDCCXXIII.

[9a] See above, footnote 2.

[10] Vale, ac diu vive, Trajano melior, Augusto felicior. *Serenissimæ Celsitudinis tuæ,* Servus Humil. CÆCILIUS FOLIUS.

But we are concerned with Folius' atavistic notion of the circulation of the blood. The description was written and published in Venice, in 1639, but it is certain that the patent foramen ovale in an adult cadaver, which it records, was discovered in the course of a public dissection performed most probably by Folius himself, perhaps as prosector under Vesling in the University of Padua, in 1637, although Folius is known to have performed public dissections in Venice. As for the delay of two years before publication, in his preface Folius informs the "candid and benevolent reader" that he had hesitated this long time so that he might produce a work more polished, but that certain exigencies impelled him to write when he did. There was "the audacity, not to say the temerity and impudence of a certain person [cuiusdam] who, clothing himself with my own labors, vigils, and sweats, is surreptitiously passing around a sort of rude and incorrect drawing of the perforated heart." [11] Folius therefore brought his book to birth untimely, in order that the same thing might not happen to him which happened to Vergil on that occasion when he wrote

> I made the poem which he sings;
> He carries off the prize it brings! [12]

It is interesting to speculate upon the identity of this "certain person." Æmilius Parisanus had studied under Fabricius of Aquapendente in Padua, and then had settled in Venice. In 1635 he published a folio volume entitled "The Second Part of the Noble Exercitations on Subtlety." [13] Among the monographs which composed this volume was one "On the Motion of the Heart and the Blood, against William Harvey." [14] This was one of the earliest of the works written against Harvey, its only important predecessor having come from the pen of Primerose, in 1630. The latter is said to have written his book in just fourteen days, at the instigation of Riolan, and Vesling had labelled it "for the most part ineffective and pointless." [15] Parisanus had an extensive medical practice in Venice, but apparently he wished to be known as a distinguished anatomist. He was some forty eight years older than Folius, and it is not impossible that he

[11] Audacia enim, ne dicam temeritas, ac impudentia cujusdam meis laboribus, vigiliis, atque sudoribus sese induentis, necnon perforati Cordis rudem quandam, atque penitus ignaram delineationem e manica proferentis has meas primitias utcumque incultas, inornatasque in lucem edere, necessitas perpulit.

[12] Hos ego versiculos feci, tulit alter honores.

[13] *Nobilium Exercitationum de Subtilitate Pars Altera*, Venice, 1635.

[14] *De Cordis et Sanguinis Motu ad Guilielmum Harveum.*

[15] Imbellia pleraque et sine ictu.

looked askance upon the young Paduan anatomist who came to Venice to be professor, for Parisanus was known as self-willed and an arrogant man. Again, Parisanus is reputed never to have performed a dissection—and, indeed, his anatomical writings support this repute—and as a prosector under Vesling and the performer of several public dissections Folius would have little respect for such an academician. It is just possible that Parisanus had witnessed the dissection performed in 1637 which disclosed the patent foramen ovale of which Folius was writing. And it is just possible that the man who was displaying the "sort of rude and incorrect drawing of the perforated heart," which prompted Folius to bring his book to birth untimely, was none other than Parisanus. It is true that when Folius mentions Parisanus for the first time he calls him *eruditissimus Æmilius Parisanus noster*, but such superlatives were fashionable at the time and are not significant necessarily. And it is true also that when Folius comes to his point of disagreement with Parisanus, he employs expressions which are at least equivocal:

A short time later [*i. e.*, after the publication of the *Anatomy* of Constantius Varolius] the subtlest and most talented of all men of our own and all past ages, Æmilius Parisanus (may God in His mercy preserve and protect him unharmed, for the benefit of all), in Book VI of his *Noble Exercitations on Subtlety*, the Second Exercitation, Chapter 3, has philosophized so copiously and with such abundant and superabundant excellence upon this subject that, if the truth be told, he would easily have compelled me to acquiesce by the superlative cogency of his reasoning, if experiment had not persuaded me otherwise. For, by reasoning, he shows so beautifully that the spleen generates, cocts, and prepares the blood for the heart, and that the heart cools the blood (and was formed by Nature to do just this), and proves this doctrine with such perfect clarity and acuity, that really I think nothing ever could be said better.[16]

Vesling labelled Parisanus' book against Harvey "completely disgraceful!" [17]

In any event, the dissection under discussion had been performed in 1637 before "many noble and excellent physicians and skilled surgeons."

[16] Postmodum subtilissimus, atque inter cunctos nostri, et anteacti ævi ingeniosissimus Æmilius Parisanus (quem Deus sua pietate ad omnium utilitatem incolumen diu servet, atque tueatur) Libro sexto Nobilium suarum exercitationum de subtilitate, exercitatione secunda, capite tertio adeo fuse satis, superque optime in hac re philosophatus est, ut si verum dicere debeo, ni experientia aliter suaderet, facile validissimus ejus rationibus cogeret aquiescere, cum adeo perpulchre Lienem Cordi Sangvinem suppeditare, coquere ac præparare ratiocinando demonstret, nec non Cor ipsum refrigerare, atque propter ipsum a Natura fuisse fabrefactum, hocque ita dilucide, atque acutissime comprobatum, ut meo quidem judicio melius nihil unquam dici possit.

Perhaps the whole point of this passage lies in the clause, *ni experentia aliter suaderet*, which I have expressed, "if experiment had not persuaded me otherwise."

[17] In quamplurimis turpius.

And especially [continues Folius] "even the most illustrious and excellent Master John Vesling, knight and professor of anatomy and botany in Padua," took the trouble to come graciously into Folius' own laboratory and to inspect the patent foramen ovale scrupulously. And Vesling it was who pointed out to his student that this opening was precisely that anastomosis which Galen, long ago, said existed in the fœtus between the vena cava and the venous artery (pulmonary vein). And Vesling, according to Folius' preface, later acknowledged that this passage was patent in the adult, and was not obliterated, as Galen had supposed, although later Vesling recognized that usually it does become obliterated at last in senescent individuals, as in fact he demonstrated publicly "this year" [*i. e.*, 1639].[18]

In the "Uncommon Animadversion upon the Recently Discovered Lacteal Veins," which is really only an introduction to the author's views on the circulation of the blood, Folius teaches that chyle is extracted from the food undergoing digestion in the intestine and is transported through the lacteal vessels to the liver. In the liver the chyle undergoes coction and generates blood. This blood is passed through the (inferior) vena cava to the right ventricle—for Folius had no conception of the function of the auricle and looked upon it merely as the "insertion" of the vena cava, or its dilated extremity—and now Folius finds himself confronted with the problem of the circulation.

He presents, therefore, the traditional view of Galen, not wishing to subscribe to Harvey's new theory. The blood passes from the right to the left ventricle of the heart through perforations in the interventricular septum. These perforations resemble small funnels; their wider ends are open to the right ventricle; their narrower extremities terminate in pores which open into the left ventricle. These pores are invisible on two accounts: their parvitude, and the fact that in a dead animal the tissues have become cold and dense. Moreover, experiment shows that if an animal be exsanguinated by section of its arteries, after death its veins also will be found empty; therefore there are anastomoses between the arteries and the veins throughout the body—anastomoses so narrow as to be imperceptible,

[18] . . . quicquid novi in hoc meo parvæ molis reperitur opusculo ab ingenioli mei imbecillitate duobus abhinc annis in Anatome publica coram compluribus Viris Nobilibus, Excell. Medicis, peritisque Chyrurgis fuisse patefactum. Necnon etiam speciatim Perill. atque Excell. D. Joanni Veslingio Equiti, ac in Patavino Gymnasio Anatomico & Botanico primario, qui solita humanitate intra parietes meos id accurate, ac hilari vultu perspicere non fuit dedignatus, primusque ingenuè monuit meatum hunc Anastomosim esse, quam Galenus in fœtu inter Venam cavam, et Arteriam Venosam consistere jam dudum posteritati scriptum relinquit. Qui et agnovit postea patentem esse hanc ipsam viam, nec ut Galenus credidit obliterari, quamvis serio cognoverit in senescentibus tandem hoc ipsum contingere plurimum, uti et publicè hoc ipso Anno ab eo demonstratum fuit.

but which, nevertheless, afford passage for both blood and spirit from the veins to the arteries. These, of course, would be the capillaries.[19]

"And this notion," continues Folius, "of the circulation [!] of the blood, which had been consigned to oblivion, was brought back into dispute by William Harvey, a man endowed with outstanding genius and the highest intellectual capacity."[20] It is clear that Folius is referring to the capillaries and that his word "circulation" applies to the passage of blood through them, which Folius takes in a more or less Galenical sense.

Folius appears to have felt that his own theory, to be presented in the sequel, would derive strength if he marshalled the opinions of others and set them up like so many ninepins to be knocked over.

First, Andreas Laurentius, attacking the problem why the blood flows only from right to left through the pores in the septum, and not from left to right, attributed this to "a proper power and natural faculty or property of the heart itself."

Second, Realdus Columbus noted that in some animals the septum is cartilaginous and stated that blood could not possibly pass through cartilage. Therefore he postulated "a longer way."

> The blood having left the heart through the pulmonary artery is carried to the lungs; here it is attenuated; then, together with air, it is carried to the left ventricle of the heart through the pulmonary vein. There are two excellent reasons (wrote Folius) by which this dogma of his is sustained: in the first place, the caliber of the pulmonary artery is much greater than would be needed for the nutrition of the lungs; and in the second place, the blood in the pulmonary vein is always very thin.[21]

Third, there was the opinion of Leonardus Botallus, "who discovered a foramen (and boasted that it was known only to himself) which formed a passage from the right to the life side of the heart. This duct was conspicuous enough in calves and the larger animals, he said, but he admitted that it was not so conspicuous in man and in older animals." This of course was the patent foramen ovale, and Botallus was teaching that the adult intracardiac circulation was the same as that in the fœtus.

[19] Galen: *On the Natural Faculties*, III, xv.

[20] Quam quidem sententiam de sanguinis circulatione oblivioni traditam disputationi revocavit Gulielmus Herveus Vir sane perspicaci ingenio summaque Virtute præditus.

[21] Egressus e Corde Sanguis per Venam Arteriosam ad Pulmones fertur, ibique attenuatur: deinde una cum Aere per Arteriam Venalem ad sinistrum Cordis Ventriculum defertur. Rationibus quibus hoc suum fulcitur dogma duæ sunt potissimæ; prima amplitudo Venæ Arterialis major quidem quam pro nutriendis Pulmonibus necessum sit; Altera vero, quia in Arteria Venosa sanguis tenuissimus continuo perspiciatur.

In the fourth and fifth places Folius epitomized the theories of Ulmus Pictaviensis [27] and Constantius Varolius, which will be mentioned again; and in the sixth place the opinion of Parisanus, which has been quoted.

And finally Folius listed the theory of Joannes Lambergius, which was similar to that of Columbus and Servetus.

These were all of the theories concerning the motions of the heart and the blood to which Folius had occasion to refer, and he took exception to all of them. But he excused himself from refuting them one by one on the ground that " it is not our purpose to disprove the opinion of anyone, but only to seek the truth and to make it known, and others will decide whether we accomplish this or no." [28]

From this point forward the reader probably will gain a better knowledge of the theory and the method of Folius if recourse is had largely to direct translation. And first he establishes his fundamental principle, proving it on the ground of universal assent. It should be noted that a distinction was made between arterial blood and venous blood: the venous blood was formed in the liver and was " sooty;" the arterial blood was formed during the passage of the venous blood through the invisible pores in the septum, or, according to Parisanus, Ulmus, and others, in the spleen, and contained air and spirits which made it " thinner " than venous blood. So Folius says:

> No one in his right mind denies or doubts that other blood is necessary for the generation of arterial blood, whether this other blood comes through the septum, or through the pulmonary vein, or from the arteries [*i. e.*, having been generated in the spleen], or from whatever source, or by whatever means it is moved in the vessels. Therefore the proposition is established by universal assent and by infallible necessity.
>
> Therefore if this blood is to be carried to the left chamber of the heart there must be some route which it takes, and this also is conceded by everyone. But everyone does not claim the same route. Therefore we ought to inquire and investigate

---

[27] This was François Umeau of Poitiers, 1530-1594. The theory referred to was expounded in his *De Liene Libellus* (Paris, 1578). In the traditional way, the venous blood was generated in the liver and passed through the vena cava into the right side of the heart. From here a portion was sent through the pulmonary artery to the lungs, for their nourishment; the remainder was distributed to the veins of the body. The arterial blood, on the other hand, was generated in the spleen and transmitted through the lienal artery to the cœliac, thence to the aorta and the arterial system, much of it entering the left ventricle itself.

[28] Folius does not mention Servetus. While it is possible that he did not know of Servetus' theory of the pulmonary circulation, it is more probable that he omitted the name because it was not entirely safe to honor the memory of a man who had been burned at the stake for heresy in the not too distant past.

as diligently as possible what the route is. And precisely this will be made clear by the following argument and experiment.

The workings of Nature, that noble Teacher, are not random. She never is lacking when there is need; She never is prodigal when there is no need. If, then, She uses one means once, we must believe that She will use the same means always (or at least as long as the same need exists). For She cannot act otherwise unless some impediment or defect should arise, in which event She uses the best of all the alternative means. Even today some philosophers accept this principle as the very foundation of their reasoning. And indeed it stands self-evident and indubitable, for any other would not truly explain the workings of Nature nor mirror the works of the Omnipotent. Thus this principle is so self-evident that it would be utterly absurd to accept any other in its place, and to do this would be the greatest possible heresy in philosophy. This, then, is my major proposition.

But She (namely, Nature) formed, in the fœtus, an anastomosis of the vena cava with the pulmonary vein in such a way that the blood should flow from the right auricle into the left, as Galen and all other anatomists admit. And this is my minor proposition.

Therefore we must conclude that Nature uses the same anastomosis in the adult also. And this is proved by experiment also; and anyone can prove it for himself by repeating the experiment and demonstrations which I am about to describe. Thus anyone can see clearly and can understand how so many of the wisest men, both ancient and modern, when they thought differently, fell into error and strayed from the facts. For the facts are as follows (although I reserve the right to alter my conclusion in favor of a better one):

Near the base of the heart, where the vena cava approaches the parenchyma, there is a certain foramen (as is shown in figure I) [see p. 29] which Galen called an anastomosis. In the fœtus this affords easy passage for the blood from the right ventricle of the heart into the left (as everyone agrees, and as was said above).

But, literally according to Galen (*De Usu Partium*, Book VI, the last chapter) Nature dries up the vein which passes from the navel to the liver, and also the arteries which are near the spine,[24] until they resemble thin cords. And in the same way, when the animal is born She obliterates the anastomoses of the vessels which belong to the heart and which I have mentioned.[25] Most wonderful!

Why do I say "Most wonderful?" Because dissection has proved the opposite many and many a time, and I have demonstrated the truth in dissections to everyone and anyone who cared to see it. And anyone skilled in dissection, or calling himself an anatomist,[26] can see it for himself, but not without much toil and the greatest difficulty, for in many cadavers the passage is very tortuous and an impediment is

---

[24] The vein is, of course, the intraabdominal part of the umbilical vein. The arteries would be the umbilical arteries, although to place them "near the spine" is sufficiently misleading.

[25] These, of course, are the ductus arteriosus and the foramen ovale.

[26] One wonders whether this is intended to describe Parisanus. The passage reads, "et quisquis rei Anatomicæ sive peritus, sive studiosus per se poterit videre."

offered by those folds which are found on both sides of the septum and which resemble valves.[27]

Therefore if Nature always uses this passage in the fœtus, and never any other, why should we not say that She uses this same passage in the adult, where the need for it is even greater?—and most especially because the anatomical observation which I am about to describe demonstrates clearly that She does.

But if perhaps in some individuals this passage is obliterated by the beneficence of Nature (as I shall discuss in greater detail when I write about the multiple motions of the heart),[28] then, since She is provident in all things and especially benign in this, She forms certain foramina which are shown in figure II. Through these the blood flows freely, and, as is appropriate, more from the right auricle into the left, as anyone can see clearly for himself by repeating the following experiment:

Securely tie down the animal to be vivisected; open the thorax; free the heart well from the pericardium. Ligate rapidly all of the upper vessels entering or leaving the heart, except the vena cava; then quickly open the left ventricle and auricle. Remove the blood from them with a sponge or a clean cloth. Now more blood will be seen to issue clearly and manifestly from the aforementioned foramina shown in the figure. I have performed this experiment successfully time and time again and upon various animals. So what?[29]

So Galen stands, with his invisible foramina in the septum. And had they been necessary in the fœtus Nature would have formed them in it. But She did not, because, if She had, the anastomosis would have been in vain. And we may not even say this, for we know from Aristotle and from the nature of things that nothing occurs in vain.

And let Laurentius rant of his 'occult faculties;' anyone can give such an answer to any question, concealing his ignorance in an 'occult faculty.' And Columbus too, when he talks about the bony septum which he found!

Indeed, his opinion is the more probable of the two even though it cannot be accepted for many reasons, one of which is that the same vessel cannot and ought not at one and the same time to subserve two functions which are contrary to each other, namely, the nutrition of the lungs and the procreation of the animal spirits, one of which is performed with motion and the other with rest.[30] And other similar reasons could be adduced which I pass over for the sake of brevity, especially since other authors have mentioned them. But I cannot help wondering how the illustrious Laurentius could say that the opinion of Botallus contradicts itself on the ground that this foramen is easily seen in new-born calves but not in older calves,

---

[27] These, of course, would be the remnants of the septum primum and the septum secundum.

[28] Presumably another book which Folius never got around to writing.

[29] The passage reads simply, "Quid?" If my colloquialism is objectionable it may be diluted to a very proper and Emersonian "What then?"

[30] For truth to traverse so vast and so intricately interwoven a web of error was as difficult (as Harvey knew well) as it was for Folius' probe to traverse the tortuosities of an obliterated foramen ovale.

since he himself, in his book *On Catarrh*, in the chapter entitled "The nutrient vein of the arteries, noted by no one hitherto," states that it is manifestly found in all calves—even though he himself did not know what foramen this was, since he called it a new discovery. We must suspect that the author did not consult his source, not only because of this but also because he did not know the man's name but called him John. We are compelled to think that he wrote such statements without documentation.

As for the rest—namely Ulmus, Varolius, and their followers—it is enough to point out the impediment of the valves which are in the heart at the mouth of the aorta, so that the blood having left the heart should not enter it again. This reason alone is enough to destroy their theory.[81]

For me it is enough to affirm that if, from the nature of things, this flowing of the blood ought to be toward the left, certainly it will be from the right. Moreover it can be seen plainly to occur through the foramen shown in figure I, or better through those shown in figure II. I am ready at any time to demonstrate this to anyone who wishes me to do so. Why should I say more?

Folius ends his work in a half apologetic tone:

I have written this not in order to lessen the glory of others but in order to bring the truth to light. For I know that we cannot all embrace all knowledge; that knowledge accrues by the addition of part to part; that we all are like children upon the neck of a giant; and that we see far more than the ancients saw. Therefore I ought not to be criticized for my good work, especially since everyone knows how long I have labored with all the powers of my skill and my intellect, and of what kind, what number, and what magniture were the innumerable controversies and dissensions which I have had to bear. May the thrice greatest and omnipotent God, in His mercy toward us, grant that truth may replace opinion, and may He bestow perpetual felicity and all good things upon us.

I, Cæcilius Folius, caused this work to be printed in Venice in the twenty fourth year of my life, in the sixteen hundred and thirty ninth year from the Incarnation of Jesus Christ.[82]

The copperplates, figs. I and II, are reproduced below in the appendix (p. 28). They were enlarged from microfilm negatives of the originals, and must go through other processes before being reproduced in the *Bulletin*. Mr. Leo C. Massopust, Sr., Director of the Department of Art and Photography of Marquette University School of Medicine, in his unfailingly gracious way, has made drawings (*see* below, p. 29) which enable the reader to locate the lettered structures on the copperplates, a task which

[81] The aortic valve, of course, and the only passage where a knowledge of the function of a cardiac valve is apparent. One could conclude that Folius had this from someone else and used it without grasping its implications.

[82] Annum XXIV. natus Venetiis typis mandabam *Ego Cæcilius Folius Anno ab incarnatione Jesu Christi M. D. C. XXXIX.*

otherwise would be extremely difficult. Folius' original legends, in translation, accompany the reproductions of the copperplates.

A brief recapitulation will not only yield the essence of Folius' somewhat rambling work, but should shed light upon the decayed scholasticism of seventeenth century Padua.

Our author's point of departure is the principle that other blood is essential for the production of arterial blood. This principle is proved upon two grounds: first, it has universal asent; and second, it is infallibly necessary. It follows, then, that this " other blood " must be transported to the left ventricle of the heart, for it is there that the arterial blood is generated. It does not require a logician to point out that the universal assent was lacking and that the infallible necessity was fictitious.

Folius now proceeds to his syllogism—which, of course, no logician would recognize as a syllogism even though it is cast in the form of one. The major premise is stated: Nature does nothing in vain and, wherever possible, she uses the same means uniformly to attain her end. The minor reads: Nature uses the foramen ovale in the fœtus, the means whereby the blood from the right side of the heart is transmitted to the left. And the conclusion is that therefore Nature uses the foramen ovale in the adult also, for the same purpose.

It seems indisputable that Folius had discovered a patent foramen ovale in an adult cadaver. The cadaver must have been human since its dissection was performed publicly. From Folius' preface it may be inferred that he took the heart with him to his lodging and asked Vesling to come and inspect it. It may be inferred further that the foramen was patent, and that Vesling recognized it for what it was, for he told Folius that this was the " anastomosis " which Galen had described as existing in the fœtus, but which, Galen had added, was obliterated soon after birth.

Perhaps we may picture Folius as making other dissections during the next two years, in each of which he looked for the foramen. Normally, of course, the foramen is obliterated soon after birth, or reduced to a minute, tortuous, and functionless canal. Folius might probe this canal and widen it. He might also, using the probe, create an artificial opening or two, or even three—the fff of figure II. It was known to one Payanus, a surgeon, about 1632, that an artificial opening was easy to make, and at a dissection which he performed in Aix about that year he showed that it is of highest importance to prove that the canal has a lining membrane before one can say that it was not artificially or accidentally made.[38]

[38] Tallmadge, G. Kasten: Pierre Gassendi and the *Elegans de Septo Cordis Pervio*

As for the experiment which Folius performed and repeated, and by which he demonstrated that blood does pass through the septum—we may say that this was not the first, nor by far the last, time that the application of the venerated methods of science has resulted not in truth but in error.

Our Folius should not be confused with a younger contemporary who appears not to have been related by even remote family ties. This was Franciscus Folius, of Tuscany, who lived from 1624 to 1685. He is said to have begun to practice medicine at Bibbiena at the age of eight!—but, whether this be true or no, by 1665 he was family physician to the Medici. In his *Recreatio Physica in qua de Sanguinis et Omnium Viventium Universali Analogica Circulatione Disseritur* (Florence, 1665) he supported Harvey's theory of the circulation of the blood. He has been given high praise for this, though on what ground is difficult to determine: by 1665 the circulation was a quite firmly established theory. He is said also to have performed a transfusion of blood on August 13, 1654, in the presence of the Emperor Ferdinand II, and to have performed it successfully. In his *Stadera Medica* (Florence, 1680), he gives an account of this.

APPENDIX

In the following I have translated quite literally the legend referring to the characters which Folius used to index his figures, except in the case of the confusing *vena arteriosa*, which is the pulmonary artery, and *arteria venosa*, which is the pulmonary vein.

Index of the Characters in Figure I

This first figure shows the right side of the heart intact; but the auricle dissected, and the vessels which arise from the heart itself, and especially the anastomosis through which the blood flows from the right into the left ventricle.

AAA. The heart in its normal position, and the coronary veins disseminated on its surface.

BBB. Right auricle of the heart partly dissected and partly still intact.

C. That whitish and circular place between the auricles in which, on this side and beneath a kind of pellicle resembling a valve, the anastomosis is found. This is the tortuous foramen through which the blood passes into the left ventricle.

D. The vena cava dissected down to the liver.

Observatio, Bull. Hist. Med., VII, 429-457 (1939). Gassendi fell into the same error with Folius only a year later (*i. e.*, 1640).

Copperplates from Folius, *Viæ sanguinis a dextro in sinistrum cordis ventriculum defluentis accurata delineatio* (edition Leiden, 1723).

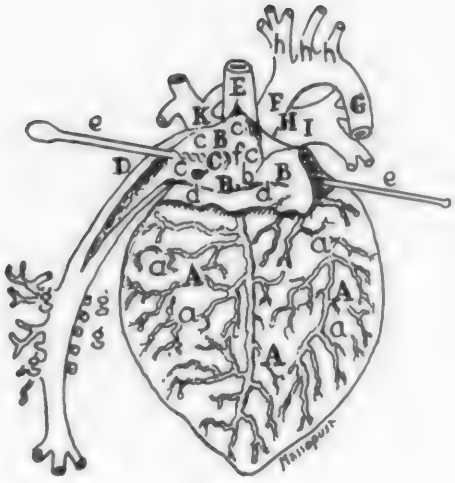

FIG. I

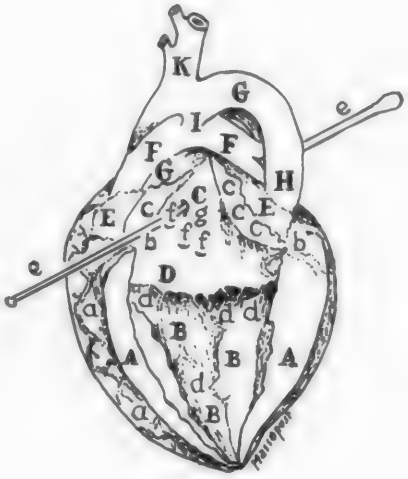

FIG. II

E. Aortal vein [superior vena cava], passing to the neck and arms, dissected.
F. Ascending aorta.
G. Descending aorta.
H. Ductus arteriosus connecting the aorta with the pulmonary vein [*sic*, and only another example of the confusion over " venous artery " and " arterial vein ; " it should, of course, read " pulmonary artery "].
I. Pulmonary vein issuing from the right chamber of the heart [*sic*!].
K. Pulmonary artery, the nutrient artery of the lungs, issuing from the left chamber [*sic*!].
aaaa. Coronary veins spread like roots throughout the surface of the heart.
b. Beginning of this coronary vein in the auricle near the vena cava.
cccc. Dissected part of the auricle.
dd. The other part, still intact.
ee. Stylus placed in the anastomosis.
f. The valve-like pellicle against the mouth of the anastomosis.
gggg. Branches of the vena cava disseminated like roots throughout the liver.
hhh. Ascending branches of the aorta.

Index of the Characters in Figure II.

This other figure shows the left ventricle of the heart and the dissected auricle and demonstrates the exit of the stylus shown in figure I.

AA. The incision made through the whole of the left ventricle of the heart.
BBB. Exact representation of this ventricle.
C. The place of exit of the stylus through the anastomosis from the right into the left auricle.
D. Valve at the mouth of the aorta.
EE. Dissected left auricle of the heart, smaller than the right [because, of course, Folius includes the sinus venarum cavarum with the right].
FF. Pulmonary artery issuing from the right ventricle of the heart.
GG. Ascending aorta.
H. The same, descending near the spine.
I. Ductus arteriosus connecting the aorta with the pulmonary artery.
K. Ascending trunk of the aorta to the arms and neck.
aa. Showing part of the coronary vein dispersed throughout the surface of the heart, of which a very small portion can be seen.
bb. Coronary artery, dissected.
cccc. The incision of the left auricle as far as the pulmonary vein.
dddd. Certain nerve-like structures in the ventricle itself, which Aristotle considered to be nerves.
ee. Stylus placed in the anastomosis.
fff. Certain narrow foramina through which the blood flows when the anastomosis is obliterated because less blood is needed.
g. Valve placed on this side of the anastomosis also.

Folius' whole thesis disintegrates at the points fff in figure II. These narrow foramina were either imaginary or the results of his probing too carelessly. It should be noted that the same characters do not represent the same structures in the two figures.

The copperplate was made by R. Blokhujsen. The ornamentation of the stylus may offer interest to some. In figure I the ductus arteriosus is represented in a way which is anatomically incorrect.

THE OSTEOGRAPHIA OF WILLIAM CHESELDEN

K. F. RUSSELL

This study of William Cheselden's *Osteographia* was undertaken in an attempt to elucidate the problem of the many varied issues of the book which exist today. After the lapse of over two centuries it is, of course, sometimes difficult to prove one's facts, but, luckily, Cheselden has left a number of clues scattered throughout the various editions of his *Anatomy of the Human Body* and in *Osteographia* itself and these have simplified the task.

When Cheselden published his *Osteographia* in 1733 he had every reason to be proud of the book. That he had been engaged on its production for a number of years is shown in the Preface to the 1726 edition of his *Anatomy* where he gives an account of the new book indicating that even at that date the work was well advanced:

> The fifteen plates which were in the first edition I should have made entirely new, if I had not been so much engaged about an Osteology, in which every plate is twenty one inches long, and fifteen broad. All the bones will be done as large as the life, and the bones of the limbs and trunk, with sceletons as large as the plates will admit of: And besides these there will be some plates of the cartilages, ligaments and diseased bones; and every chapter will have a distinct head-piece and tail-piece, which will be chiefly made of the sceletons of different animals; and in what manner this will be performed Tab. X. page 69 is offered as a specimen. [The Tab.X. referred to shows a maxilla and mandible and these are portion of Plate IX of the *Osteographia*].

The insertion of this note and the sample plate in his popular text-book is a good example of Cheselden's very modern sense of advertising for he lost no opportunity of telling his readers about his plans for his publications and giving them most generous discounts as an incentive to buy new editions. He says in the Preface of 1726 edition of his *Anatomy*:

> And it being justly esteemed an hardship, that books should be reprinted with additions, without printing the additions separate, for the use of those who have the former editions, and these corrections and additions of Mr. Monro's, with others of my own, being such as could not be conveniently printed by themselves; I have therefore taken care that the books of the former editions (though ever so much defaced or imperfect) may be changed for this at two shillings in sheets.

Cheselden's idea in publishing the *Osteographia* was to produce an atlas of osteology in which the emphasis was on accuracy of reproduction and

Fig. 1.

Portrait in oils of William Cheselden in the possession of the Royal Australasian College of Surgeons, Melbourne (see Appendix 3).

towards this end he spared neither trouble nor expense. To ensure that the drawings were as accurate as possible they were done by means of a camera obscura and a vignette on the title page shows this apparatus in use. The author himself gives such an excellent account of his aims and ideals and of the preparation of the plates for the book that his Address to the Reader is worth quoting in full:

Every bone in the human body being here delineated as large as the life, and again reduced to lesser scales, in order to show them united to one another; I thought it useless to make long descriptions, one view of such prints showing more than the fullest and best description can possibly do; and for this reason in the several chapters the mechanical contrivances of the bones are rather treated of than their shapes.

The first drawing we made was a front view of the scull, (Tab. iii.) in the same attitude with a most excellent one in Vesalius (whose figures were drawn and engraved by Giovanni Calker, as Giorgio Vasari informs us in his book of the lives of the painters; they are performed in so exquisite a taste that they have usually been taken for Titian's, and always considered as a study for painters; yet it must be confessed, that most of them are far short of just representations of the things they were drawn after.) Then we proceeded to others, measuring every part as exactly as we could, but we soon found it impossible to execute the difficult parts of such work in this way; upon which I contrived (what I had long before mediated) a convenient camera obscura to draw in, with which we corrected some of the few designs already made, throwing away others which we had before approved of, and finished the rest with more accuracy and less labour, doing in this way in a few minutes more than could be done, without in many hours, I might say in many days: And however sufficient artists may think themselves to execute perfectly the more difficult parts of drawing without such helps, it is well known that when they have occasion to draw straight lines or circles, they do not disdain to use a ruler or compass. But my engravers, Mr. Vandergucht and Mr. Shinevoet not less skilled in drawing than in their own proper art, knew too well the difficulties of representing irregular lines, perspective, and proportion, to despise such assistance, always declaring that it was impossible to do these things so well without.

Two of the smaller plates, the head of the mantyger, and the sceleton of the tortoise, and all the large plates except viii. xi. xxi. and xxxi. were done by Mr. Gerard Vandergucht, and how great an artist he is, the open free stile in which these plates are etched and engraved, and the inimitable manner of expressing the different texture of the parts sufficiently show.

The rest were performed by Mr. Shinevoet who left Holland, his native country, on account of misfortunes. He had done in England before these some excellent works, particularly inside views of cathedral churches, which he was forced to suffer another man to set his name to, and e'er he had finished my work he died. The last thing he attempted was the sceleton of a horse, which being done in the winter in his chamber without the camera, it was so unequal to the rest that I could not use it: his manner of etching, though wonderfully neat and expressive,

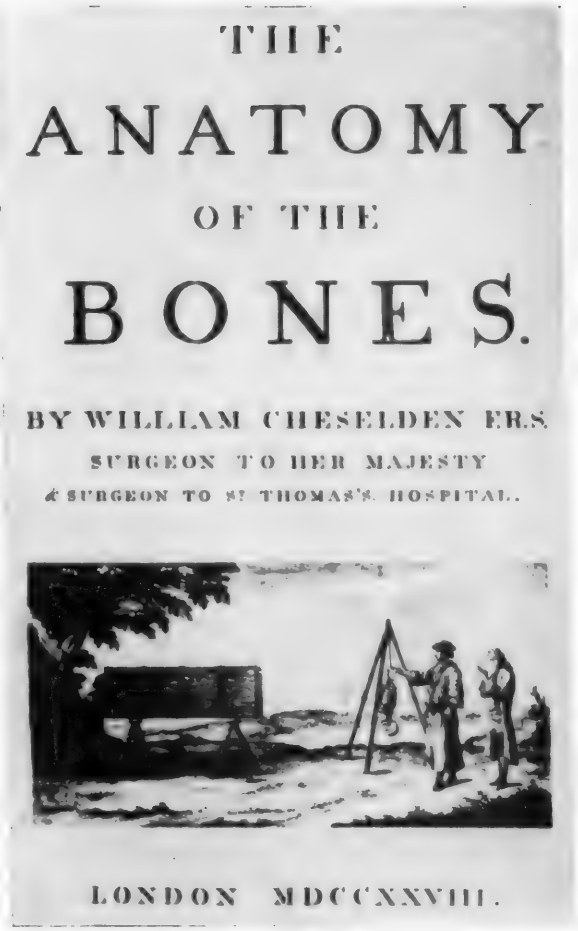
THE
ANATOMY
OF THE
BONES.
BY WILLIAM CHESELDEN F.R.S.
SURGEON TO HER MAJESTY
& SURGEON TO S^t THOMAS'S HOSPITAL.
LONDON MDCCXXVIII.

Fig. 2.

The title page of the 1728 trial issue of *Osteographia*; the unique copy of this item is in the Hunterian Library, University of Glasgow.

and so well suited to such things as he was mostly employed in, is nevertheless much inferior in stile to that of Mr. Vandergucht.

The actions of all the sceletons both human and comparative, as well as the attitude of every bone, were my own choice: and where particular parts needed to be more distinctly expressed on account of the anatomy, there I always directed; sometimes in the drawings with the pencil, and often with the needle upon the copper plate, and where the anatomist does not take this care, he will scarce have his work well performed. The expressing the smoothness of the ends of the bones by engraving only with single lines, while the other parts were all etched, was also my contriving; and what advantage this has been to the work will be seen by comparing the smooth part of the acetabulum of the os innominatum in the beginning of the book, with the head and sockets of other bones.

When I began this work I intended a whole system of anatomy adorned with the comparative, in three volumes in this manner, provided I found any encouragement. This volume being nearly finished it was offered by subscription (without solicitations) at four guineas, with a promise that none should be sold afterwards for less than six; but meeting with little success, the further prosecution of this design was laid aside: This volume is made above twenty per cent. (which I always intended) better than the subscription proposals. There are no more printed in english than three hundred, and one hundred prints are taken off designed for a latin or french edition, which being finished, the plates shall be destroyed that the price of the book may never sink in the possession of the subscribers.

That Cheselden succeeded in his ideals is very evident when the book is examined. It is doubtful if a more sumptuous volume has ever been printed on an anatomical subject and while the purist may doubt the wisdom of including pathological specimens in a book on anatomy it must be remembered that these constituted a part of anatomy in those days, being treated as anatomical curiosities; thus, in the same way, he included pathological specimens and surgical cases in his text-book on general anatomy.

The technical perfection of the printing of the book is outstanding but the printer remains anonymous. However, it would seem not unlikely that the book was printed by William Bowyer who produced the 1730, 1732, 1740 and 1741 editions of the author's *Anatomy*. The beauty of the book lies in the magnificent copper-plates, the delightful head and tail-pieces and the perfection of the engraved title and dedication to the Queen. Cheselden must have had several trial titles made and one differing in wording from the final issue and dated 1728 which belonged to William Hunter is now in the Hunterian Library at Glasgow. This unique item will be discussed in more detail later.

In spite of its magnificence, its accuracy, the good reviews that it received, and above all the enormous amount of money that Cheselden

OSTEOGRAPHIA,
OR THE
ANATOMY
OF THE
BONES.

BY WILLIAM CHESELDEN

SURGEON TO HER MAJESTY;

F. R. S.

SURGEON TO S[T] THOMAS'S HOSPITAL,

AND MEMBER OF THE ROYAL ACADEMY OF SURGERY AT PARIS.

LONDON MDCCXXXIII.

Fig. 3.

The title page of the 1733 issue.

had put into it, *Osteographia* was almost a complete failure. Issued by subscription at four guineas only 97 copies were sold out of the 300 printed. This misfortune is revealed in an advertisement in the 1740 and 1741 editions of the author's *Anatomy* which states:

> Some years since, I deliver'd to subscribers, my Osteography, in large folio, consisting of 56 copper-plates, with the bones as large as the life: The book is divided into ten chapters, each of which is adorned with a frontispiece, head-piece and tail-piece, and a beautiful initial letter. The subscription books were deliver'd at four guineas each, with a promise that no book should be sold for less than six afterwards. There were two hundred and three remaining after the subscribers had their books, fourscore and three of which I have cut to pieces. The 11 frontispieces to the chapters, and the 10 head pieces, which are sceletons of brutes, being taken from the books which were cut to pieces, will be immediately sold at ten shillings. And the prints of the human bones, being 56 large folio plates, will be sold for thirty shillings a set. These prints, which will be proper ornaments for a surgery, may be had at Mr. Cook's Book-binder at the Bible in Fetter-lane. In a short time I intend to break all the plates, which will sufficiently secure my promise to the subscribers, and then the remaining books will be expos'd to sale.

Bibliographically this advertisement is the most important inclusion Cheselden made to his text-book for it gives us the clue to the many and varied issues of *Osteographia* that are in existence today and are presumed to be complete by booksellers and collectors. To be complete as originally issued a copy of *Osteographia* must have two sets of plates, one set lettered and with text on the verso, the other set unlettered and blank on the verso. This is made quite clear in John Belchier's review of the book in the *Philosophical Transactions* of the Royal Society for November 1733 in which he states towards the end:

> Each Book has a double Set of Prints, one before they are lettered, to shew them in their full Perfection: and the other with Letters, answering to their Descriptions.
>
> The Advantage of a Set of Prints before they are lettered, will readily be perceived, when compared with the other: And how much these Figures excel any others of their kind, will appear at the first View, they being executed in so free and open a Stile, and expressed with so much Spirit, and (what is very rare) without the least kind of Exaggeration.

Belchier's review naturally praises the book for he had been Cheselden's pupil and is portrayed in the vignette on the title page arranging the skeleton for the artist. Moreover much of the review is based on the address to the reader by Cheselden, the phraseology in some instances being almost identical, as will be seen in the appendix to this paper where the review is quoted in full.

OSTEOGRAPHIA,

OR THE

ANATOMY

OF THE

BONES.

In FIFTY-SIX PLATES.

By WILLIAM CHESELDEN.

Every BONE in the HUMAN BODY is here delineated as large as the Life, and again reduced to leſſer Scales, in order to ſhew them united to one another.

Likewiſe the gradual Increaſe of the BONES, from the firſt Appearance of Offification in the Fœtus to that of an Adult, their internal Texture, as alſo the Ligaments of the Joints, and a great Variety of DISEASED BONES are here exhibited.

This Work was executed in a Camera Obſcura contrived on Purpoſe by the Author, which renders it more exact and complete than any Thing of the Kind whatever; one View of ſuch Prints ſhewing more than the fulleſt and beſt Deſcription can poſſibly do.

LONDON.

Fig. 4.

The title page of the undated issue.

Not all the reviews praised the book, indeed John Douglas disliked it so much that he railed against Cheselden in a book with the title *Animadversions on a late pompous book, intituled, Osteographia: or, the anatomy*

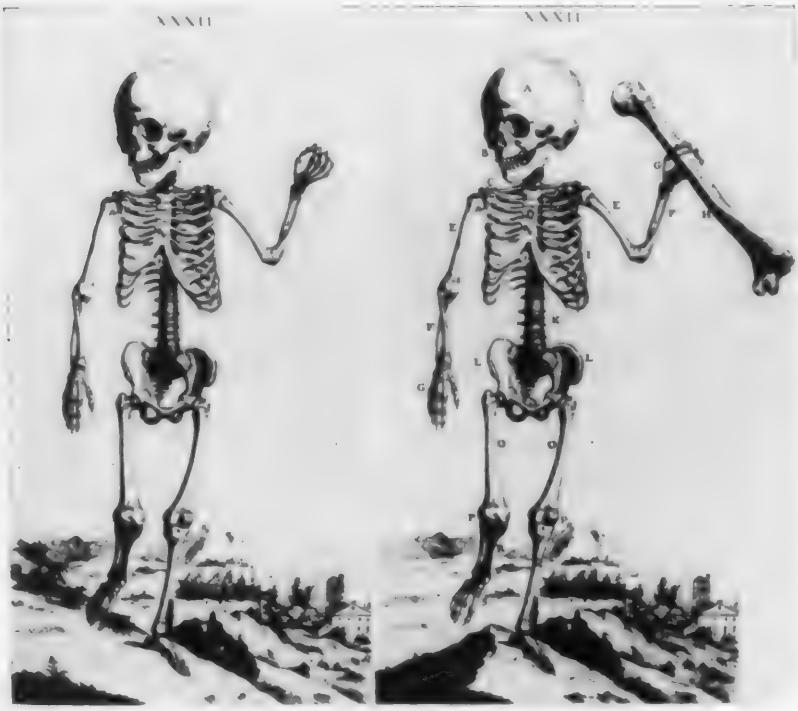

Fig. 5.
Plate XXXII in the unlettered set of plates

Fig. 6.
The same in the lettered set.

of the bones, etc. (London, 1735). This was a vicious attack both on the book and its author, an attack that was quite unjustified and which probably did more harm to Douglas than to Cheselden.

The Various Issues of Osteographia

A. *1728 trial issue*

The / Anatomy / of the / Bones. / By William Cheselden F. R. S. / Surgeon to Her Majesty / & Surgeon to St. Thomas's Hospital. /

(Vignette)

LONDON MDCCXXVIII.

Collation. Title: LVI unlettered plates printed on recto. There is no text or letterpress of any kind but the plates are numbered.

This unique copy is in the Hunterian Library, University of Glasgow.

B. *1733 dated issue*

Osteographia, / or the / Anatomy / of the / Bones. / By William Cheselden / Surgeon to Her Majesty; / F. R. S. / Surgeon to St. Thomas's Hospital, / and Member of the Royal Academy of Surgery at Paris. /

(Vignette)

LONDON MDCCXXXIII.

Collation. Frontispiece, verso blank: Engraved title with vignette, verso blank: next leaf recto blank, verso Royal Arms: Dedication to the Queen (engraved), verso skeleton of deer: *To the Reader*, 3 pp., vignettes as head and tail pieces, on verso of last page skeleton of a monkey: *Introduction*, 5 pp. vignettes as head and tail pieces, on verso of last page engraving of tiger's skull: Chapters I-VIII, 39 unnumbered pages consisting of 32 pp. of text and 7 full-page engravings, there are head and tail pieces to each chapter, on verso of last page of Chapter VIII is the text of Plate I: Plates I-LVI with text on verso of all except the last, on verso of LVI is skeleton of deer: Plates I-LVI repeated without text or lettering, on verso of second LVI is vignette of a broken column and FINIS.

Plate XXXII in the lettered set differs from the same plate in the unlettered set: in the former the skeleton holds a humerus in its left hand and the ground under the right foot has been redrawn.

It can be stated quite definitely that no copy of the 1733 edition of *Osteographia* is complete unless it has two sets of plates.

C. *Variant of 1733 issue*

As in B above but the vignette on the title and that of the broken column on the last page are printed in RED.

In this issue also the engraving of the Royal Arms is on the verso of the title and not on a separate leaf.

These may have been trial issues and possibly were printed earlier than issue B above.

D. *Undated issue*

Osteographia, / or the / Anatomy / of the / Bones. / In Fifty-six Plates. / By William Cheselden. / Every Bone in the Human Body is here / delineated as large as the Life, and again / reduced to lesser Scales, in order to show them / united to one another. / Likewise the gradual Increase of the Bones, from the first / Appearance of Ossification in the Foetus to that of an / Adult, their internal Texture, as also the Ligaments of the / Joints, and a great Variety of Diseased Bones are / here exhibited. /

This Work was executed in a Camera Obscura contrived on Purpose by the / Author, which renders it more exact and complete than any Thing of the Kind / whatever; one View of such Prints showing more than the fullest and best / Description can possibly do. /

LONDON

Collation. Title, verso blank: LVI plates each printed on recto of leaf without text and unlettered, on verso of LVI is the skeleton of a deer. There is no frontispiece. The title-page is printed and not engraved as in the dated issue and is on heavier paper than the plates.

E, F. *Variants of undated issue*

As in D above but with the addition of either one or the other or both of the following:

(a) a single page headed "Explanation of the Tables" and giving a brief description of the plates.

(b) a printed slip stating: "These prints are the first impression being taken off before the plates were lettered, which have since been broken to pieces by Mr. Cheselden's order."

This note is ambiguous for the plates were destroyed after 1741, this being indicated by Cheselden in his advertisement to the 1740 and 1741 editions of his *Anatomy*. Hence this slip was printed after this date. The prints, of course, *were* taken off the plates before lettering.

Copies of the undated issue are also seen with a portrait by Faber after Richardson bound in as a frontispiece. This is certainly an addition put in after purchase by the owner, for Faber's print was not published until 1753.

Discussion

In the printing of such a work as *Osteographia* trial and experimental pulls of the plates and title must have been made from time to time in order to test different effects and arrangements of the engravings. This would probably explain why some copies have the title vignette printed in red instead of the usual black. It would certainly explain the 1728 issue with its completely different title and the unique copy of this issue in the Hunterian Library at Glasgow may well have been Cheselden's own trial volume. It may be, of course, that this particular title, although a trial, was wrongly dated by the engraver and MDCCXXVIII engraved instead of MDCCXXXIII; this is unlikely if only because engravers of the standard of Van der Gucht do not usually make mistakes of this nature.

There remains for discussion the undated edition with the single set of plates and the vexed question of why this issue was made and when it appeared.

It is said by booksellers and collectors that this undated issue is an early one and appeared before the ordinary dated edition. The basis for this argument rests on the fact that the plates are unlettered. While it is true to say that the unlettered plates are an early impression it is not true to say that they appeared before the lettered set for, as has already been shown, with the exception of the 1728 trial issue, they appeared together in the same volume. The title of the undated issue is quite different from the others and is phrased in a way that is very similar to portions of the address to the reader in the dated issue. Moreover the title is printed, and printed in a clumsy, overloaded fashion quite different from the stately typography of the text in the dated edition. It combines both title and explanation and is out of keeping with the magnificent plates that follow: it is printed, too, on a very heavy, coarsely-textured paper that is quite different from that of the plates. In short the title to this issue was printed at a different time to the plates.

The answer to this problem almost certainly lies in the advertisement that Cheselden inserted in the 1740 and 1741 editions of his *Anatomy* and which has been partly quoted already. Cheselden had 300 copies of *Osteographia* printed plus 100 sets of the plates for a Latin or French edition should either be necessary. In 1741 he tells us that he had 203 left after the subscribers had got their copies. Of this number he had broken up 83 copies leaving 120 complete copies still for sale. He broke up the 83 copies in order to offer sets of the plates of human bones at thirty shillings each and sets of the plates of comparative skeletons at ten shillings. The 83 copies would yield 83 sets of lettered and 83 sets of unlettered plates: these added to the 100 full sets of plates not used for a foreign edition would give Cheselden 183 lettered and 183 unlettered sets of plates for disposal.

I feel quite sure that title-pages were printed for the unlettered sets of plates sometime after 1741, probably by Mr. Cook, the book-binder at the Bible in Fetter-lane; they were bound and these constitute the undated issue of *Osteographia*.

The unlettered set of plates being complete in itself was suitable for binding as a volume. It would have been difficult to bind up a set of the lettered plates because the text for Table I is on the verso of the last page of Chapter VIII and if this were left in or removed the volume would appear incomplete. Moreover the unlettered set would appear more attractive when bound. In those copies of the undated issue that have been examined Plate LVI has on its verso the skeleton of a deer and is identical with the same plate of the lettered set. In the unlettered set that appears in the dated issue Plate LVI has on its verso the vignette of the broken column and FINIS, and the question as to why this plate was not used instead of the former (with the deer on the verso) could, I think, only be answered by Mr. Cook of Fetter-lane.

Cheselden's reason for breaking up the copies of *Osteographia* and selling the plates in single sets was obviously to get back some of the money that he had expended on the publication of the book. Even so he must have lost a small fortune.

When the 1740, large paper, edition of his *Anatomy* was printing Cheselden took the opportunity of replacing the old osteological figures with new ones based on those in his *Osteographia*.

Acknowledgments

The author owes a debt of gratitude to a number of individuals. To R. O. MacKenna, Esq., the University Librarian and Keeper of the Hunterian Books and Manuscripts at the University of Glasgow, for supplying microfilm and a description of the 1728 issue. To Professor A. N. Burkitt and Miss H. Hunter, of the Department of Anatomy, University of Sydney, for the loan of copies of *Osteographia*, to Professor E. Ford for checking various issues and the Fisher Librarian of the same University for supplying microfilm. To Miss M. Stanton, of Yale, for checking the Cushing copies against my description. To the Secretary, Royal Australian College of Surgeons, for permission to reproduce the Cheselden portrait. To W. R. Le Fanu, Esq., the Librarian of the Royal College of Surgeons of England, for help in checking copies. To Professor F. Wood Jones, of the Royal College of Surgeons of England, for information on the portrait which he presented to the Australian College and to Kingsley Adams, Esq., of the National Portrait Gallery, for comments on this portrait.

Finally the author feels that his greatest debt is to the memory of William Cheselden himself for his modern sense of salesmanship in including details of his publications in his popular text-book and giving his readers the right of obtaining copies of a new edition at cut rates. This fact alone was sufficient to make his book popular but its real popularity was founded on good anatomy and although Cheselden has been neglected in the past it must not be forgotten that he was one of Britain's greatest anatomists.

Appendix 1

An Account of a Book entituled, Osteographia, or, the Anatomy of the Bones, by William Cheselden, Surgeon to Her Majesty, F. R. S., Surgeon to St. Thomas's Hospital, and Member of the Royal Academy of Surgery at Paris,

By John Belchier, Surgeon, F. R. S.

[From *Philosophical Transactions* of the Royal Society, November 1733, No. 430, page 194]

XIII. For the Frontispiece to the Book our Author has made choice of a Story very suitable to a Work of this Kind, which is a Description that Galen, in Lib. i.

Cap. 2 de Anatomicis Administrationibus, relates of a Robber that was killed on a Mountain by a Traveller, whom he attacked, and whose Body no one cared to have buried, but were rather glad that so wicked a Man should become a Prey to the Vultures. Two Days after Galen went to see this Body, and found the Bones picked as clean as if prepared for the Instruction of Students.

This Opportunity he mentions as a Piece of good Fortune, because, in those Days, it was very rare to meet with a skeleton, by what he observes to the young Physicians in the same Book, that he used to examine Bones which he found in Graves, and in the Ruins of Monuments; and once he met with a Body, which by the over-flowing of a River, was washed out of a Sepulchre that was slightly built on the Bank of the said River; the Flesh being destroyed, the Bones were left entire.

He likewise takes notice, that there was a Skeleton in the Physick-School at Alexandria, which he thought would amply compensate the Trouble of any one to go on Purpose to study.

The Figure representing Galen contemplating the Skeleton, is taken from a Philosopher of Salvator Rosa.

At the Bottom of the Title-Page he has given a Print of a Camera Obscura, which he mentions in his Preface to have contrived and drawn all his Bones by, and without which Assistance (notwithstanding he employed the greatest Artists in their way) he found it impossible to give a true and perfect Representation of them, there being so much Difficulty to express the Outlines of Bones in their different Attitudes.

This occasioned my looking into Vesalius's Book of Anatomy more carefully than I had done before, whose Figures have hitherto been esteemed the most beautiful of their Kind, and are performed in so exquisite a Taste, that they have usually been taken for Titian's, and always considered as a Study for Painters.

Yet whoever will give himself the Trouble to measure his Bones with real ones, will find many egregious Errors, which would take up too much room here to particularize; but upon the whole I find there is no kind of Proportion kept, and that his Bones in general are between ⅛ and ¼ Parts too short for their Breadth: and tho' his 3 Skeletons have been so remarkably famous, that several Anatomical Writers have copied after them, yet when carefully examined, it will be very easy to discover many Imperfections in them, though all together, they strike the Eye wonderfully.

This Camera he mentions not only as a great Help to him, by giving true Proportions and Outlines, but likewise for a more speedy Dispatch; doing more this way in one Day, than could possibly be done without in several.

It is a long square Tube set upon two Tressels (as represented in the Print before his Book) whose Inside is made black, to prevent the Reflection of Light; towards that End which is nearest the Object, is a Convex-Glass placed in a sliding Frame, through which the Rays passing from the Object, converge and meet in a Focus upon the Table-Glass placed near the other End, analogous to the Crystalline Humour and Retina in the Eye.

The Object here represented is the Trunk of a Skeleton fixed to a Painter's Ezel, which being inverted, appears upright to the Table-Glass, on the rough Side of which the Artist delineates with a Pencil, which afterwards he traces off on Paper. The Convex-Glass placed in the sliding Frame being moved backward or forward, makes the Object bigger or less, keeping it's due Proportions.

This Camera has several Advantages beyond the common one; for in this, Objects as big as the Life may be taken, or reduced gradually to any Scale; whereas the other only diminishes, and that in a very great Degree.

In this Work the gradual Increase of the Bones is described, even from the first Stages of Ossification, to that of an Adult, when every Bone is represented as large as the Life in different Attitudes; as likewise most of the Bones sawed through the Middle, to shew their internal Texture; And in order to shew how they are articulated to each other, there are several Plates wherein they are reduced to lesser Scales, and again reduced, to give a View of them all united together in Representations of six different Skeletons, where the Difference of the Growth of the Bones is very apparent, as likewise the different Shapes of the Male and Female Bones. There are likewise several Plates of Bones prepared on Purpose to shew the Ligaments which unite them together, as also the Cartilages at their Ends, besides a great Variety of most curious and remarkable diseased Bones.

And at the Front and Close of every Chapter, as likewise the Blank Pages, are Skeletons of the most remarkable Animals of their kind, which are not only very ornamental, but even very useful; most of them describing the Œconomy of the different Species of Animals.

The Author in his Treatise gives a general Description of the whole Work, though not so minutely as some might expect, he thinking it useless to give long Descriptions in a Work of this Kind, one View of such Prints shewing more than the fullest Description can possibly do; for which reason, in the several Chapters, the mechanical Contrivances of the Bones are rather treated of than their Shapes.

Each Book has a double Set of Prints, one before they are lettered, to shew them in their full Perfection; and the other with Letters, answering to their Descriptions.

The Advantage of a Set of Prints before they are lettered, will readily be perceived, when compared with the other: And how much these Figures excel any others of their kind, will appear at the first View, they being executed in so free and open a Stile, and expressed with so much Spirit, and (what is very rare) without the least kind of Exaggeration.

At the End of his Preface he takes notice, that when he began this Work, he proposed to go through the whole System of Anatomy, adorned with the Comparative, in three Volumes in this manner; the farther Prosecution of which Design he has now entirely laid aside, it requiring so much Leisure, as renders him incapable of the Performance; and the vast Expence attending such a Work (besides other Inconveniences) will, I doubt, prevent the Execution of it by any Body else, especially in so grand a manner, this being undoubtedly the most magnificent Work of the kind now extant.

Appendix 2

ADVERTISEMENT

This edition having rendered the former editions of little use, and the additions being not fit to be printed alone, I have taken care that the purchasers of the former editions may change their books for the Vth edition on great paper at fourteen shillings a book in sheets, which is four shillings less than the price at shops. Of these there are but two hundred and fifty printed, and are call'd the Vth edition for distinction sake. A VIth edition on small paper will be published as soon as these are disposed of, and exchanges for them will be allow'd at five shillings and sixpence in sheets which is three and sixpence less than the price at shops. These exchanges will be made at Mr. Cook's, Book-binder at the Bible in Fetter-lane, where they may be had unbound or bound in the best manner.

Some years since, I deliver'd to subscribers, my Osteography, in large folio, consisting of 56 copper-plates, with the bones as large as the life: The book is divided into ten chapters, each of which is adorned with a frontispiece, head-piece and tail-piece, and a beautiful initial letter. The subscription books were deliver'd at four guineas each, with a promise that no book should be sold for less than six afterwards. There were two hundred and three remaining after the subscribers had their books, fourscore and three of which I have cut to pieces. To 11 frontis-pieces to the chapters, and the 10 head-pieces, which are sceletons of brutes, being taken from the books which were cut to pieces, will be immediately sold at ten shillings. And the prints of the human bones, being 56 large folio plates, will be sold for thirty shillings a set. These prints, which will be proper ornaments for a surgery, may be had at Mr. Cook's Book-binder at the Bible in Fetter-lane. In a short time I intend to break all the plates, which will sufficiently secure my promise to the subscribers, and then the remaining books will be expos'd to sale.

This advertisement was inserted in the 1740, large paper, edition of Cheselden's *Anatomy* and also in the 1741 edition. As well as giving information on the *Osteographia* it gives details about the large paper edition of the *Anatomy*. It shows that 250 copies were printed which sold at eighteen shillings unbound in sheets and it also points out that the 1740 and 1741 editions are identical apart from size and quality of paper.

Appendix 3

A NOTE ON THE PORTRAIT

This portrait of Cheselden was presented to the Royal Australasian College of Surgeons, Melbourne, by Professor F. Wood Jones, F. R. S. and has not been previously published.

When compared with the portrait by Jonathan Richardson in the Royal College of Surgeons of England it will be seen that they are the same size (29½ x 24¼ inches) and both are painted as ovals on rectangular canvases. It would appear that the Melbourne portrait is a contemporary copy of the London one although it is possible that it could be a replica by Richardson.

Kingsley Adams, Esq., of the National Portrait Gallery, was good enough to give me an opinion on a photograph of the Melbourne portrait. He suggested that it was painted not from the original but from an engraving after the original. He thought that this was so because of the simplification of the modelling of the face.

JAMES RUSH, PIONEER IN AMERICAN PSYCHOLOGY, 1786–1869

STEPHEN G. KURTZ

A physician who was willing to forsake his practice in order to pursue research in basic science was a rarity in the early nineteenth century, but one who chose the human mind as his special province was certain to be regarded as more of a curiosity than anything else. James Rush (1786-1869) came by his eccentricities naturally, however. His father, the erratic Benjamin Rush, had shocked the medical profession more than once by his oracular pronouncements on the treatment of disease, and events proved his son James the most faithful of his disciples.[1]

James Rush would probably have chosen the medical profession without parental pressure, but Benjamin Rush had been keenly disappointed by the refusal of his two eldest sons to follow in his steps, and James never had an opportunity to choose freely. Fortunately, the object of this strenuous vocational guidance proved tractable and displayed a natural tendency towards scholarship, though his tutor, in reporting his progress to Benjamin Rush, proved a most uninspired prophet when he predicated that James would more likely add a saint than a leader to the family.[2] Young Rush entered his father's alma mater, the College of New Jersey, at fifteen, worked as an apprentice with his father after graduation, and sat at his father's feet as a medical student at the University of Pennsylvania taking careful notes on the elder Rush's lectures. He accepted his father's dictum that post-doctoral work at the University of Edinburgh, the same institution from which Benjamin Rush had graduated half a century earlier, would be profitable. Only once was there an indication that James rebelled against his father's will: he refused to deliver his senior oration at college on Benjamin Rush's pet topic of female education. "An Oration on Poetry" remains among his papers as a tribute to this spark of youthful independence.

Edinburgh was a natural choice for a young Philadelphia physician at

[1] Richard H. Shryock, "American Indifference to Basic Science in the 19th Century," *Archives Internationales d'Histoire des Sciences*, no. 5, 1948, pp. 50-65. See also Dr. Shryock's articles on Benjamin and James Rush in the *Dictionary of American Biography*, vol. XVI, pp. 227-230.

[2] Dr. John Hall to Benjamin Rush, 1799, James Rush *MSS.*, Ridgway Library, Philadelphia. George W. Corner, ed., *The Autobiography of Benjamin Rush* (Princeton University Press, 1948), pp. 320, 370.

the beginning of the nineteenth century. For two generations colonial students had received their medical training there, and Benjamin Rush remained a disciple of the noted William Cullen and his system of physick to the end of his days. His assumption that Edinburgh medical theories would not conflict with his own and that his son would find a year of advanced study in Scotland a stimulating experience proved completely erroneous. Young Rush found that his father's scientific theories were viewed as fantasy and that a belief in the proximate causes of disease which Rush senior still clung to had long been overthrown. Edinburgh had advanced in the scientific tradition of empirical research while Benjamin Rush was still theorizing.[3]

The letters which James and Benjamin Rush exchanged between 1809 and 1811 reveal how completely the scientific outlook of the younger man had been warped by his father's dogmatism. The advice that he enroll in Dr. James Gregory's course in physiology proved the worst possible guidance from the young American doctor's point of view. The elder Gregory, under whom Benjamin Rush had studied, had not passed on his love for system to his successor, and James Rush viewed the constant use of specimens from the dissecting room as "useless and disgusting." "Medicine does not appear to be gaining here," he wrote in his first letter home. "Theory is warred against, or rather, new theory."[4] A few weeks later he had made up his mind that Edinburgh was years behind Benjamin Rush in its search for scientific truth. "The medical world is a chaos here. There is matter enough to form a system, but none of that order and connection which form the uses and beauty of one. The light seems not to have reached it; I ask myself in vain, why Edinburgh is called the seat of medical science."[5]

While Rush continued to hold firmly to his father's theory that all diseases were in reality one disease, Gregory and his associates continued to explore and to suggest that truth could only be arrived at by taking an inductive approach. Characteristically, Rush took laborious notes on Gregory's lectures despite his conviction that he was learning nothing of value. By mid-winter he was willing to admit that Gregory was a tolerable lecturer. "We have made a little more progress in this tiresome subject. Although Dr. Gregory treats this in an agreeable style and manner, still these cannot make up for the matter—I have heard the

[3] Whitfield Bell, "Philadelphia Medical Students in Europe, 1750-1800," *Pennsylvania Magazine of History and Biography*, January 1943, pp. 1-29.

[4] James to Benjamin Rush, August 30, 1809, James Rush *MSS*.

[5] November 23, 1809, *ibid*.

same too often for it to be even tolerable. . . ." His basic complaint remained the same, however. "Dr. Gregory has no system to inculcate." After eight months of study Rush appeared as strongly bound by his father's prejudices as ever. "What originality falls from Dr. Gregory are rather facts or observations of quantity rather than quality: that is, such facts as livers weighing twenty pounds, joints enlarged to an enormous size, rather than ingenious comparisons of the phenomena of disease and deductions from them, facts that anyone may only look at to know, rather than those discriminations requiring an intellectual discernment which, like the gifts of sublime eloquence and poetry, come but once in several ages." [6]

When Rush came down with a cold he determined to treat it in the manner to which he had been accustomed. "It was only a cold, but knowing what its effects might be, I took it in the right way, and now after *five good bleedings* I hope I have escaped." His Edinburgh friends were as horrified at his barbarism as William Cobbett had been at his father's efforts to fight Yellow Fever with blood letting in 1793. "The complaint came on with a depressed pulse, and you know the only cure for this. . . . Truths like these are found so sparingly here, that when I do meet them they give me new life. Dr. Stewart told me seriously that he should feel himself responsible to my father if I should lay my bones here through my obstinance. Principles, and American Principles, Sir, made me bleed." [7]

Benjamin Rush was undoubtedly pleased by his son's testimonial, but he must have caught a new note in this same letter which was not so reassuring. "As to proximate causes of disease," James commented tersely, "I consider that as quite unphilosophical." Gregory and Edinburgh had begun to split the solidarity of father and son despite Rush's belief that he had learned everything in Philadelphia which was worth knowing. To a friend he wrote that the philosophical tradition in medical studies was not producing results.[8] He seemed to hold Gregory in low esteem, but his exposure to empirical methods had made a greater impact upon his mind than he realized, or perhaps a greater impact than he cared to admit to Benjamin Rush.

At the end of the academic year Rush set out for London with a lighter heart. His sister Mary had settled down in the British capital

[6] To Benjamin Rush, March 1, 1810, *ibid.*
[7] *Ibid.*
[8] To John Drinker, December 1809, James Rush *MSS.*

after her marriage to a British army officer and had promised to introduce her brother to the social life of the metropolis. Rush also had hopes that the reputation of London medicine would not prove so exaggerated as Edinburgh's had been. His time was well spent from both the social and professional points of view. "From eight till nine in the morning I attend Dr. Pierson on the practice of physick, I then go to Charles Bell's dissecting room where I stay till hospital time. I return to Bell's and am, from two till half past three at his lectures on anatomy. Two nights a week I attend Bell, and two nights Astley Cooper on surgery. On Saturday I hear Mr. Davy at the Royal Institution on chemistry." [9]

Whatever time was left over from this heavy schedule the American physician devoted to the salon life which his sister and her friends opened to him. He became deeply impressed with the cultural benefits of upper-class English life. Music and art were new worlds to him, and the tone of an evening's conversation could not help but remind him that he had been raised in "the colonies." "It is an intercourse of this kind which must be constantly taking place in such a place as London that serves to make able men still more accute," he wrote his father. "It is a kind of philosophical friction of men's minds, that gives to science its greatest polish." Class distinction disturbed the American visitor, however. To his younger sister Julia he commented on the number of his father's old acquaintances who had snubbed him after initial invitations. "I have heard that you have expressed a wish to come to England that you might see and hear all that was going on in this country of splendor and gaiety and wonder. But my dear sister, you don't know what you ask. Only let me assure you that your situation is far more enviable as Miss Rush in Philadelphia than if you were Lady Julia in London." [10]

After a year in London, James Rush was eager to return to America and begin his practice. The lack of republican ideals, the close surveillance of foreigners at customs offices, and the growing antagonism between England and his own country during the height of the Napoleonic Wars gradually dampened Rush's earlier enthusiasm. Nevertheless, he retained the belief that scientific truth best prospers in an aristocratic social structure to the end of his life. Freed of many illusions and of the absolute devotion to his father's medical theories with which he had arrived, Rush returned to Philadelphia in the late summer of 1811.

Benjamin Rush was well beyond a respectable retirement age and was

[9] To Benjamin Rush, March 4, 1811, *ibid.*
[10] James Rush to Benjamin Rush, March 4, 1811, James Rush *MSS.*

delighted to turn his practice over to his son. The family name, the modest wealth which the practice promised, and his own circle of friends pointed Rush towards a comfortable and rewarding life as a successful Philadelphia practitioner. When his father died, in 1813, James was able to carry on with the loss of few, if any, of Benjamin Rush's patients; and as an active general practitioner he continued for ten years.

Gradually Rush's interests turned away from his practice towards the study of the human thought process, a matter which had fascinated Benjamin Rush as a result of his work with the insane at the Pennsylvania Hospital.[11] Perhaps with the hope of being invited to fill a chair on the faculty of the University of Pennsylvania Medical College, he accepted an invitation to lecture on the subject of the human intellect in 1815. Rush was disheartened to find that his lecture had aroused little interest and was especially disturbed that only two trustees of the University attended. The event was an important one for him nevertheless. It marked him as one of the first men of his generation who had decided that the field of human behavior was a legitimate one for scientific investigation. He was not a man who could accept public criticism or indifference, and rather than face ridicule or misunderstanding he chose to work in obscurity, firmly persuaded that his attitude towards mental phenomena was years in advance of his age. Despite the honors which fell to him as a result of his subsequent studies, Dr. Rush became convinced that a democratic society was incapable of appreciating the importance of research in basic science. His marriage to Phoebe Ann Ridgway, the daughter of a wealthy Philadelphia merchant, in 1819 gave him the financial independence which he needed in order to limit his practice and devote an increasing amount of time to his studies in psychology. The pattern of his life broke accepted social practice among successful physicians.[12] Rush's life-long devotion to the study of the mind was the first research project in America in the field of psychology.

Ann Ridgway was undoubtedly the only woman in Philadelphia who could have built the type of home which Rush demanded and needed for his research. An only child, she had been educated in France and was

[11] R. H. Shryock, "The Psychiatry of Benjamin Rush," *American Journal of Psychiatry*, January 1945, vol. CI, pp. 429-432.

[12] In an address to the graduating class of the University of Pennsylvania Medical College in 1840 Samuel Jackson, M. D., pointed out that far too few American physicians continued their medical studies after leaving medical school. Jackson believed that society, in condemning those who tried to pursue basic research work, was responsible for the retarded development of medical science in the United States. "An Address to the Medical Graduates of the University of Pennsylvania," Philadelphia, 1840.

determined to lead as independent a life as possible. When she returned to the United States shortly before her marriage she did so with the intention of living fully up to her abundant means and to introduce to Philadelphia the gaiety of Parisian salon life. Her spacious home on Chestnut Street became a favorite gathering place for socially prominent intellectuals and her own activities the object of almost continuous gossip. Rush found his wife's independence almost a relief: she did not insist that he enter into her social life, and she rarely intruded upon him while he was closeted in his study.[13]

The period which began with his marriage and ended with the publication of the *Philosophy of the Human Voice*, in 1827, marked the halfway point in James Rush's metamorphosis from active physician to scholar-scientist. "I am now forty-one years of age," he wrote to a British friend of student days. "In 1819 I married a Miss Ridgway, and still have no children. Eighteen months after my return to this country, I had the misfortune to lose my father. It caused a great part of his patients to transfer their patronage to me, and I have continued to be the laborious physician, being perhaps most happy in the necessities of its labors, and in the stolen leisure of study and a sort of philosophic seclusion which is at high variance with the jig-making literature and frothfeast of science, which in the rage for home manufactures is the great American staple for domestic fame." [14]

In his solitude Rush had written his first and most enduring scientific treatise, *The Philosophy of the Human Voice*. It was intended as the first volume of a systematic study of the mechanism of the human thought process and was described by the author in the preface "as a methodical investigation of the various vocal phenomena: thereby to include the subject within the limits of science." [15]

In view of the almost universal interest in oratory, Rush could not have chosen a better aspect of mental phenomena with which to begin his study. Like most new adventures in science, particularly one which boldly announces that the old order is dead, *The Philosophy of the Human Voice* was met by a skeptical attitude. Yet within ten years Rush's analysis of speech had won widespread recognition among students and teachers of oratory and rhetoric. His most enthusiastic admirers were Dr. Jonathan Barber of Harvard and William Russell of Andover Semi-

[13] Austin K. Gray, *Benjamin Franklin's Library* (New York, 1936), pp. 59-61.

[14] "To an English friend," an undated letter of 1828, James Rush *MSS.*, Ridgway Library.

[15] 7th edition (Philadelphia 1879), p. 45.

nary in Massachusetts. The book was finally adopted as a text at Harvard, Yale, Princeton, Columbia, and Brown Universities.

In November 1834 Barber's commendatory review of the work appeared in the *Knickerbocker Magazine,* and Russell warmly defended Rush's approach to the study of the voice in a paper delivered at the 1836 convention of the American Institute of Instruction. "Your success has been greater than that of most discourses in science," wrote Barber in 1834. "You have lived to see your principles adopted in the first universities of the land." [16] Election to the American Philosophical Society followed in 1828, and Philadelphia physicians honored Rush by urging the trustees of Jefferson Medical College to tender him an appointment to the faculty. To these honors were added election as an honorary member of the French Academy of Science and favorable commentary in British medical journals, all duty noted among his papers, yet Rush felt that his work had not been well appreciated.

Modern scholars have recognized James Rush as a pioneer in American psychology. "He anticipated in an extraordinary way the very modern concept of thought as subvocal speech.[17] His demand for medical science to take up work left hitherto to philosophers and rhetoricians was a unique challenge at that time. "By every scheme of the cyclopedia," he wrote, "the subject of the voice is allotted to the physiologist; yet he has strangely neglected his part by borrowing much of his supposed knowledge from the wild notions of the rhetoricians. It is time at last for physiology to take up its task." [18]

In the introductions to seven editions of his study Dr. Rush lashed out at what he felt was the moribund state of scientific investigation in the United States. His deep disappointment over hostile criticism touched his hypersensitive nature far more than the abundance of praise which he received. "I have a sort of opinion of mankind that prevents my caring a great deal about financial matters," he wrote to his brother Richard, then American Minister to the Court of St. James. "As I never shall need a reward for the kind of intellectual labour I feel myself fitted for and delight in, and never shall receive it, I can the more cooly express an expectation that in fifty years the world of philosophic inquiry

[16] Jonathan Barber to James Rush, September 2, 1833, James Rush *MSS.*, Ridgway Library.

[17] J. W. Fay, *American Psychology before William James* (Rutgers University Press, 1948), p. 142. Lester L. Hale, "A Reevaluation of the Vocal Philosophy of Dr. James Rush," Louisiana State University doctoral dissertation, 1942.

[18] Introduction to the 1st edition (Philadelphia 1827).

will be willing to admit that the gift of my book is not unworthy a place on a royal shelf."

The year 1828 marked the beginning of Dr. Rush's retirement from active practice and from normal social intercourse. For reasons which his papers do not reveal he resigned from the American Philosophical Society, and learning that his nomination to the faculty of Jefferson Medical College was opposed by several members of the board of trustees, he precipitously withdrew his name. "I have learned through more sources than one of the existence of discontent arising out of the design to give me a place in Jefferson College," he wrote in his letter of withdrawal. "If disagreement within and jealousy and hatred without had not been in operation ever since the incorporation of Jefferson College, I must suppose that my withdrawing at this time would give some rest to the uneasy elements." [19]

At the same time bitter resentment towards his family burst out over their attitude towards his marriage. The entire family, he told his younger brother Samuel, had systematically slandered his wife's reputation and in so doing had made the past few years "the most painful part of her life." His brother Richard was a fool who had spent his life hobnobbing with "money-loving, business-doing, unimaginative creatures." [20] From 1828 until his death in 1869 James Rush was a recluse whose only passion in life seemed to be his studies. His almost unaccountable cynicism and disdain for the world were only increased by the publication of his *Hamlet, A Dramatic Prelude* in 1834.

Rush had long fancied himself something of a literary stylist and had maintained his interest in Shakespearian drama ever since undergraduate days. His attempt to reconstruct the events leading up to the murder of Hamlet's father was based upon his analysis of the characters which Shakespeare portrays, but if Rush's enthusiasm and imagination were excellent, his poetry was not. Philadelphia literary circles found the *Prelude* heavy going, and as a work of criticism Rush's curious and original study has left no mark. Nothing more was heard from him until the appearance of his magnum opus, *Outline of an Analysis of the Human Intellect,* thirty years later.

The death of Ann Ridgway Rush, in 1857, made her husband's withdrawal from the world complete. The fortune which had fallen to him, and his reputation as a strange eccentric made Rush the would-be victim

[19] James Rush to Judge Tench Coxe, May 10, 1828, James Rush *MSS.*
[20] To Samuel Rush, July 1828, *ibid.*

of almost countless charlatans. A British physician appealed to him on the grounds that Rush was the wealthiest man in Philadelphia and because any public spirited American ought to feel obligated to repay Britain the five thousand pounds which Daniel Webster had reputedly borrowed from Lord Asburton during their negotiations. An Illinois farmer asked for a small loan in order to get his team of horses out of mortgage, but Rush's favorite form of philanthropy throughout his life was in undercharging the few patients who still came to him. Russell and Barber received constant support for their early acceptance of the principles Rush had suggested in the *Philosophy of the Human Voice.*

Towards contemporary politics Dr. Rush grew cynical: man's political struggles were little more than evidences of a constant struggle for power. The climactic events of the fifties and the Civil War itself, Rush viewed as meaningless, unnecessary, and totally lacking in important issues. Lincoln was a demagogue, the northern states aggressive, and the South, with its "foolish secession," wild and undisciplined.[21] Through the war years he labored solitarily towards the completion of his voluminous work on the human mind.

When the *Outline of an Analysis of the Human Intellect* appeared in 1865 it was bound to be largely overlooked. The world was too preoccupied with political events, but Rush was prepared for obscurity, noting in the preface that three hundred years ought to suffice for humanity to comprehend the importance of his work. Relying upon his library and his own mind for his research material, Rush had arrived at a thoroughly mechanistic explanation of the thought process. Character types, emotional reactions, and vocational abilities might be determined or plotted by an analysis of the mechanics of thought. He surmised that the farmer, the banker, the lawyer, and the clergyman were all mental types whose capacities and outlook had been conditioned by the mechanics of their thought processes. Rush made no attempt to examine the types which he maintained existed, and such modern concepts of psychology as he prematurely proclaimed were arrived at without empirical research. In this respect he remained the disciple of Benjamin Rush to the end of his life.[22]

The ills of society Rush blamed upon the philosophers and metaphysicians. Truth could not be discovered by means of any previously conceived rationale. The metaphysician, he maintained, could not dis-

[21] James Rush to Mrs. Eliza Gilpin, January 22, 1861, James Rush *MSS.*, Ridgway Library.

[22] R. H. Shryock, "The Psychiatry of Benjamin Rush," *supra*, pp. 429-432.

cover the truth about anything, because he could not explain the nature of his own mental processes. "Foremost of the profound thinkers as they are called is the metaphysician, who groping too deeply among the 'occult causes' and effects of Spirit in the human mind, has been unwilling or unable to retrace or point out the supposed truths of his fictional system." His challenge, and the significant fact that he made it almost a century ago, went unanswered in his lifetime. "However it may appear to others, the Author considers . . . that the gradual manner in which the mind proceeds with its inquiry into itself, is so to speak, a gradual application of its physical Working Plan to explain its own physical phenomena." [23]

The self-imposed seclusion from the world around him sadly warped Rush's outlook upon life, and his sardonic wit was exhibited in the year of his death by the publication of a short volume of mediocre poetry, *Rhymes of Contrast on Wisdom and Folly*. Rush the materialist condemned his nation for its pursuit of material gain, lashed out against what he viewed as the triumph of mobocracy in the Civil War, and voiced his deep mistrust of the value of public acclaim. Though Rush's highly original work has remained in obscurity until recently, his just place as one of the first pioneers in American psychology has been recognized.[24] He cannot be accorded a place among the founders of psychology *per se*, because his own studies merely outlined and suggested fields for further investigation. His failure to grasp the necessity for empirical data excludes him from the ranks of those physicians and scientists who have established psychology as a legitimate field of study in the natural sciences. Yet the horizons which he sought, the pattern of his strange life—a career devoted solely to research—and the modern concepts which he foreshadowed, merit James Rush a significant place in the history of American science.

[23] James Rush, *A Brief Outline of an Analysis of the Human Intellect* (Philadelphia 1865), vol. I, pp. 2-33.

[24] See J. W. Fay, *op. cit.*, p. 145, for a modern evaluation of the *Analysis*.

BERNHARD BANG: PHYSICIAN, VETERINARIAN, SCIENTIST (1848-1932)

T. FRANKLIN WILLIAMS and VICTOR A. McKUSICK*

Bernhard Laurits Frederik Bang, discoverer of Bang's disease in cattle and a distinguished, lifelong worker against tuberculosis, was born at Soro, a small town on the Danish island of Sealand, June 7, 1848, and died June 22, 1932, at the age of 84, in Frederiksborg, Denmark. The Bang family traces its ancestry to an Oluf Bang who was ennobled during military campaigns in Hungary, about 1500 A. D. The Bang coat-of-arms hangs in the great hall of Frederiksborg Castle, the castle of the kings of Denmark. An early ancestor, Johansen Bang, born about 1660, was a Lutheran minister in Jutland who upon his death left his wife with a large family to care for. She managed her own plow, kept cattle, and by arduous work provided for her household. Bernhard Bang liked to believe that he acquired his ability for hard work from her. Bernhard's father, Jacob Henrik Bang, was a fine Latin and Greek scholar and headmaster of the private academy at Soro, which was endowed by the famous Danish writer Holberg. Jacob Bang collected one of the largest classical libraries in Europe. After his death the library was scattered and some of its volumes have since come to rest in libraries of this country, including that of the Johns Hopkins University. Bernhard's mother was Louise Marie Josephine Moth, also from an old Danish family.

Bernhard's early instruction was from his father, and he thus acquired a facility in Greek and Latin as well as modern languages which was useful and enjoyable to him throughout his life. He was always ready with an apt Latin quotation to fit a situation, and he continually read widely in all fields, in English, French, and German as well as Danish.

It is not known exactly why Bang chose to enter medical school after his preliminary training. Several earlier members of the family had been physicians; one had been professor of medical science at the University of Copenhagen. Bernhard in the diary of his school years referred frequently

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This biographical account was made possible by the presence in Baltimore of a son and grandson of Professor Bang. To these, Mr. Axel Bang and Dr. Frederik B. Bang, the authors are indebted for much of the information contained herein.

to newspaper accounts of medical cases, as if these were especially interesting to him. It may have been that the exciting spirit of new scientific and, particularly, biological discoveries of the 1860's attracted this young man as it did so many others: the work of Pasteur, Darwin, Claude Bernard and others was widely disseminated and discussed.[1]

FIG. 1

Bang's home on the grounds of the Royal Veterinary-Agriculture College in Copenhagen. The windows looked out on a large copper-beech tree.

In any event, Bernhard Bang entered medical school in Copenhagen and graduated as a bachelor of medicine in 1872. While in medical school he was greatly attracted to the new field of pathological anatomy, which included at that time the beginnings of microbiology, and upon graduation he wanted to continue in this field as a teacher and investigator. However, his good friend, Carl-Julius Salomonsen (1847-1924), had already taken the post as teacher of pathological anatomy at the University of Copenhagen. Bang, looking around for some other opening in this field, thought

[1] Dubos, Rene J., *Louis Pasteur, Free Lance of Science*. Boston: Little, Brown & Co., 1950. Chap. 1, "The Wonderful Century," pp. 14-15.

of trying to get a similar post in the Veterinary College in Copenhagen. Such a position did not then exist but Bang had hopes that one might be set up. He therefore spent the next two years in the study of veterinary science, in order to qualify in that subject. He later said that the hardest part of his whole education was to learn to shoe horses, a requirement of the veterinarian's course. The instructor would chide him with the quotation. "The devil takes a cold smith every New Year's Eve." He always felt that he was not adept with his hands. He also felt that his hands were too clammy for the practice of medicine, for he thought that patients would shy away from being examined by a clammy-handed doctor.

Qualification in the veterinary sciences, however, was not enough. There were no openings for teachers at the Veterinary College, and the trustees of the school could not then be persuaded to create a new position in pathological anatomy. Bang therefore turned again to medicine in human beings and accepted a position as prosector or house officer in pathology at the "Kommunhospital" or City Hospital of Copenhagen. Before beginning his duties there he spent a few months studying under von Recklinghausen in Strassburg. He worked in pathology for three years, 1874-1877, and then become resident physician on the medical wards of the hospital for two years. During that period he supplemented his income by means of a small private practice in medicine, and it is interesting to note that some of his patients remained faithful to him for many years, long after he was devoting full time to animal work.

In December, 1874, while at the City Hospital, Bernhard Bang married Anna Elisabeth Elise Klee, of a family from the Baltic provinces. Their first child, a daughter, was born when he was on the hospital staff. They lived in a small apartment in the hospital. Bang's income at the time was 850 Kroner or about $250 a year. His work was quite heavy: he often did as many as five autopsies in 24 hours and would find time for only a few hours' sleep between cases, on the floor in the corner of the autopsy room. Nevertheless he enjoyed it immensely and has spoken of those days with a quotation: "To live with small means and both hands full of work is not an unhappy fate."

It was also during those years that he completed his dissertation for the degree of doctor of medicine, published in 1880 under the title, "Observations and Studies on Fatal Embolism and Thrombosis in the Pulmonary Arteries." This was a little-recognized entity then or for several decades thereafter.

In 1878, Bang took a competitive examination for an appointment as

chief of the medical service at a new state supported hospital in an outlying town of Denmark. It is said that he obtained the first place in the examination but a political favorite was appointed in his stead. Within the next year the chief veterinary surgeon at the Royal Veterinary-Agriculture College in Copenhagen died, and Bang was offered the position of teacher of obstetrics and surgery and director of the ambulatory clinic.

FIG. 2

The veterinary faculty and students, about 1888. Dr. Bang is third from the left, seated. Dr. C. O. Jensen, a pioneer worker in cancer, is seated at the far right. Bang's three sons are in front.

Bang took a full week to deliberate this offer. He later said that it was the most difficult decision of his life, to choose between a fairly assuredly successful career of the practice of medicine, and the unknown field of the study of animal diseases. It seems evident from the course of the rest of his life that he accepted the position in veterinary science with the same chief purpose that he had had since medical school—to carry out studies in pathology and bacteriology.

After visiting the other good veterinary colleges in Europe—Berlin, Vienna, Munich, Paris, Dresden—Bang began his new duties in 1880.

The Royal Veterinary-Agriculture College (Veterinaer- og Landbohøjskole) in Copenhagen, which was to be Bang's home for the remainder of his active life, deserves special comment. It was one of the earliest of such colleges, having been founded in 1773 by Abildgaard. It was a state-supported school, with many students from the other Scandinavian and other foreign countries as well as from Denmark. Because of the importance of animal and farm products in the livelihood of the Danish people, the school has been well supported. Its grounds were kept as model gardens by the horticultural department, and in this pleasant setting on the grounds was the home assigned to Professor Bang.

Professor Bang's working day in the college was a long one. He would set out in the morning, to the stables where the sick animals were kept, wearing an old morning coat which was well known for its animal smells. His veterinary students would accompany him on his rounds of the animals. He was recognized as a good "clinician" in this sphere. He stressed the importance of close observation; he would pay especial attention to what the stable grooms had noted about the animals and would give them public credit for their observations—so much so that it was a joke in the annual students' show that their professor had once been a stable boy.

Bang returned home for lunch about 11:30. This was almost invariably a busy occasion, for friends and colleagues streamed in and out during the lunch hour to talk with him. He enjoyed these visits immensely, and would have long discussions with one or another. A close colleague, Stribolt, might come to propound energetically his ideas, arising from a visit to the Isle of Jersey, that Danish cattle-breeding was following the wrong tack. Bang would quiet him with one of his favorite Latin proverbs, "Suaviter in modo, fortiter in re." Assistants would bring in the large charts of temperatures on tuberculin-tested animals for his inspection at this time.

From the first Bang spent his afternoons in the laboratory which he set up in the school. On certain days there were lectures to give at 5:00 P. M. Dinner was with his family, and he would then spend the evening, until early morning hours, writing papers and keeping up a large correspondence with friends all over the world. Scientific meetings took up one or two evenings a week.

After trying for several years, Bang, in 1887, finally was able to have a professorship of pathological anatomy created for him. Its establishment is an interesting sidelight. Inasmuch as the school's principal support came

from the Danish government, the seeking of funds for the new post was ultimately a political matter, and Bang worked through friends with political influence to reach his goal. It is told that, then as now, some dramatic argument was needed to persuade the legislators to provide more money, and Bang's political backer promised them that if Bang could have his post and laboratory, he would discover the cause of contagious abortion in cattle. Such a rash promise Bang was able to keep for his friend, ten years later.

Bang approached bacteriological investigation with good training, having learned the techniques of the young science primarily from his friend Salomonsen, one of the leading early teachers of bacteriology. It is interesting to look through a textbook of bacteriological techniques of that day, such as Salomonsen's own, to see how highly developed the techniques already were, how relatively little has been added since then. In the opening paragraph of his textbook of 1891 Salomonsen states the basic principle: "Any bacteriologic technique has for its primary aim the isolation of micro-biological species one from the other, and the cultivation, separately, of each of these species in the state of purity. The *pure culture* is the essential condition of all conscientious study of the morphology and physiology of micro-organisms." [2] In succeeding chapters, autoclaves and incubators similar to those used at present are described; the value of solid cultural media was recognized and agar-agar had just become available; platinum needles and Pasteur pipettes were used, then as now, for transfer of cultures. The classical stains were already well known: Loeffler's methylene blue; an early form of Gram's method; the Ziehl-Neelsen method for acid-fast bacilli.

Bang's scientific accomplishments were many, but perhaps his two main interests, and the works for which he is best known, were his discovery of the abortion bacillus in cattle and his studies on tuberculosis.

Bang's classical paper on the abortion bacillus was published in 1897.[3] It is an excellent example of careful, thorough work described in fine literary style. He begins by pointing out the importance of so-called epizootic abortion: "In many regions it appears to be the disease which, more than any other, detracts from the profit of cattle-breeding." He re-

[2] Salomonsen, Carl-Julius, *Technique Élémentaire de Bactériologie*, traduit par Ray. Durand-Fardel. Paris: Rueff et Cie., 1891.

[3] Bang, Bernhard, "The Etiology of Epizootic Abortion," Jour. Comparative Pathology and Therapeutics, *10*, 1897 (reprinted in *Bernhard Bang, Selected Works*, edited by Vald. Adsersen. London: Oxford Univ. Press; Copenhagen: Levin & Munksgaard, 1936, pp. 87-121). Also, Zeitschrift für Thiermedicin, *1*, 241-278, 1897.

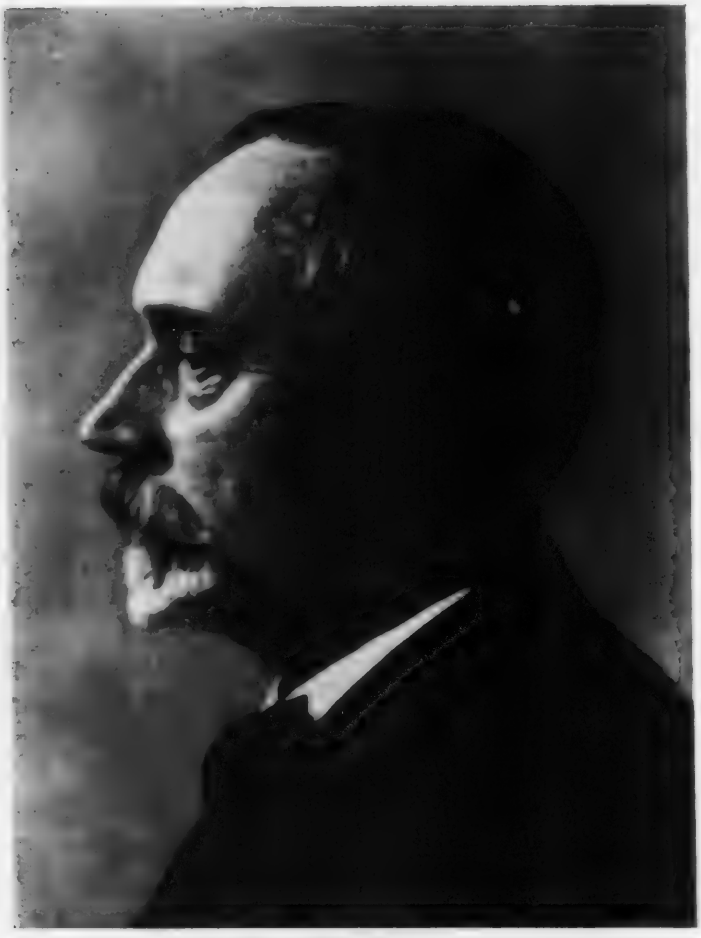

FIG. 3

Portrait of Professor Bang, about 1920. From *Bernhard Bang, Selected Works*, edited by Vald. Adsersen, Copenhagen, Levin & Munksgaard; London, Oxford University Press, 1936.

views the previous literature on the disease and shows that laymen had considered it contagious for over 100 years. However, only one previous fairly good pathological study had been made, by Nocard in France, in 1885. His materials were old and he did not isolate pure cultures of any organisms.

Bang and his pupil Stribolt therefore set out to find the cause of epizootic abortion. They bought, from a herd in which many cows had aborted, a cow that was seven-months pregnant and which was showing "all the premonitory symptoms of abortion." The cow was slaughtered, the uterus and contents removed, and the material immediately taken to the laboratory and examined under sterile conditions. Between the wall of the uterus and the fetal envelopes was found, as Bang vividly described it, "an abundant odourless exudate—a dirty yellow, somewhat thin, pultaceous material, of a slimy, somewhat lumpy character." When this was stained with Loeffler's methylene blue, many small bacteria were seen, apparently a pure culture of small rods of varying size, intracellularly and extracellularly. They stained well with fuchsin but not by the method of Gram—i. e., they were Gram-negative. They were non-motile. "This discovery," he states, "indicates that epi-zootic abortion ought to be regarded as a specific uterine catarrh, determined by a definite species of bacterium." The pathological changes in the uterine wall and fetal membranes were carefully described.

The bacteria which he found he cultured in tubes containing blood-serum and agar-agar, with the inoculate mixed all through the media. After two to four days a great number of small colonies appeared, in a single definite zone of the tubes, about one-half centimeter below the surface. This suggested that they were partly, but not strictly, anaerobic. Further careful studies in atmospheres of varying oxygen content showed that the organisms would grow at two levels of oxygen content: they would grow luxuriantly in a very high-oxygen atmosphere, and they would grow reasonably well in a certain zone of oxygen content, lower than that of normal air.

Examination of many more cases of abortion showed that the typical organisms could almost always be found. Bang also demonstrated the great vitality of the bacillus by growing it from mummified fetuses in cases of missed abortion that were many months old, and by showing that the organisms could still grow after having been kept in sterile test tubes in an ice chest for up to seven months.

"In order to make the proof complete," he goes on to say, "it was

necessary for us to bring about abortion by introducing abortion bacilli into the bodies of pregnant cows." A pure culture was therefore injected into the vagina of two cows; one aborted and showed a dead fetus with the abortion bacillus and secondary invaders present; the second cow was killed when symptoms of abortion appeared and a pure culture of the abortion bacillus was obtained from the uterine exudate. Bang thus fulfilled the postulates of Koch for considering his bacillus the cause of epi-zootic abortion. The bacillus came to be known as Bang's bacillus and the disease in cattle as Bang's disease. With his characteristic interest in preventing the disease, he advocated from the first the isolation of infected cattle.[4, 5]

Bang found that his bacillus could be given to sheep, mares, and goats and noted that goats had been reported to contract abortion when in contact with cows with epi-zootic abortion. Bang, however, apparently did not realize that the bacillus was infectious for human beings—nor did anyone else for over twenty years. The close relation between the various Brucella organisms—now called *Brucella abortus*, *Brucella melitensis*, and *Brucella suis*—was first demonstrated in 1918 by Dr. Alice Evans, of Washington, D. C. Dr. Evans pointed out the close morphological, cultural, biochemical, and serological similarities of the three species, and raised the question of the "possible pathogenicity of Bact. abortus to human subjects."[6] Shortly after this the occurrence of Brucella infections of all types in human beings was demonstrated. It is of interest that Professor Bang's son, Oluf, who later succeeded him at the Veterinary School, had, at the age of about 20, a mysterious and prolonged febrile illness. This may well have been brucellosis but there is no proof.

Bang's principal interest throughout his active life was in tuberculosis in animals, and particularly in the eradication of this devastating disease. Time and again his studies of factors in the pathogenesis of the disease led him directly to working out ways to prevent its spread and to eliminate it.

His earliest studies on tuberculosis were on tuberculosis of the udder in cows and on tuberculous milk, published in 1885, just three years after Koch's first announcement of the discovery of the tubercle bacillus. Bang

[4] *Ibid.*

[5] Bang, B., "Infectious Abortion in Cattle," National Veterinary Association, Liverpool, July 25, 1906 (reprinted in *Bernhard Bang, Selected Works, op. cit.*, pp. 122-136).

[6] Evans, Alice C., "Further Studies on Bacterium Abortus and Related Bacteria. II. A Comparison of Bacterium Abortus with Bacterium Bronchisepticus and with the Organism which causes Malta Fever," *Jour. Infect. Diseases, 22,* 580-593, 1918.

showed clearly that milk from tuberculous cattle may occasionally contain tubercle bacilli even though there is no evidence of tuberculosis of the udder.[7] These conclusions differed from those of Koch on the subject; subsequently Bang's work was amply confirmed. He was one of the first to try the effect of heating milk as a way of killing these bacilli.

The next group of studies on tuberculosis began in 1890, with the newly-discovered tuberculin. Bang carried out hundreds of tests of tuberculin in cattle. He used various dosages of the material sub-cutaneously, followed the animal's temperatures every hour for two or three days, and then autopsied the animals to establish a correlation between reactions to the tuberculin and the presence of tuberculosis in the animals. He was the first of the workers with tuberculin to test his results in the most unequivocal way—at the autopsy table. He found that a positive reaction would consist in a temperature rise, usually of three degrees Centigrade or more, the maximum occurring within twelve hours. He found a positive reaction to be remarkably specific for the presence of tuberculosis in the animal, although, as he stressed from the start, the tuberculous focus might be very small and inactive in an otherwise healthy animal. Of 61 animals with tuberculosis proved by post-mortem examination, 58 gave distinct reactions; of the three which gave no reaction, two had very minimal tuberculosis and one had far-advanced tuberculosis. Bang recognized early what is occasionally seen in human beings, a negative tuberculin reaction in a patient with very far-advanced disease. Of 16 animals with no tuberculosis found at post-mortem, 13 gave a negative reaction and three gave a questionable reaction. In this work Bang stressed the need for thoroughness in order to have dependable results, and gives as example one case in which he had to search for hours to find two tubercles of pinhead size, in which tubercle bacilli were demonstrated.[8, 9]

He began to test whole herds of cattle as rapidly as possible, and found that in many herds as high as 80% of the adult cattle were positive reactors, even though most of these animals were apparently healthy. He

[7] Bang, B., "Über die Eutertuberculose der Milchkühe und über 'tuberculöse Milch,'" Deutsche Zeitschrift für Thiermedizin und vergleichende Pathologie, *XI*, 1885 (reprinted in *Bernhard Bang, Selected Works, op. cit.*, pp. 180-202).

[8] Bang, B., "Die Bedeutung des Koch'schen Mittels für die Diagnose der Tuberculose bei Rindern und Schweinen," Berliner Thierärztliche Wochenschrift, *VII*, 1891 (reprinted in *Bernhard Bang, Selected Works, op. cit.*, pp. 237-267).

[9] Bang, B., "On Tuberculin and its Employment in combating Tuberculosis in Cattle," translated from Ugeskrift for Landmaend., *7*. Raekkes 6. Bind, 1892 (reprinted in *Bernhard Bang, Selected Works, op. cit.*, pp. 268-287).

also found some herds to be entirely free of reactors, and he came to the conclusion, as early as 1891, that tuberculosis was not an ubiquitous disease as many believed, but that it is a contagious disease, spread by intimate contact, that it " is chiefly brought about by protracted stabling with tuberculous animals or by feeding raw milk from tuberculous cows." [10] He restated this conclusion and its importance in the fight against the disease in both animal and human tuberculosis at every opportunity for the rest of his life.[11]

It was also in these remarkably complete early studies that Bang found that new-born calves only very rarely reacted to tuberculin or showed any evidence of tuberculosis anatomically. He concluded that true congenital tuberculosis is rare—rather that the tuberculosis in young calves is almost always acquired by contact with tuberculous mothers and with their milk. This was a new concept at that time.[12]

With this information Bang evolved the plan for eradicating tuberculosis in cattle which came to be known as Bang's plan: he advised that all the animals in a herd be tested with tuberculin, and the non-reactors be separated from the reactors. New calves should be put, immediately after birth, with the non-reacting group and fed on boiled milk. All the non-reacting animals, including the new calves, should be retested with tuberculin every six to twelve months, and any animals found to be positive should be transferred to the reacting group. In this way the non-reacting herd would grow by the addition of new calves; the reacting group could still be used to produce milk and to produce calves and, as the animals in it died or were sold for slaughter, the herd would eventually become entirely tuberculous-free.

In order to demonstrate the feasibility of this plan, Bang began, in 1892, a trial in a highly-infected herd in Thurebylille, in Sealand. On the first tuberculin testing, 131 animals reacted and only 77 did not. Eighty per cent. of the milch cows reacted, while only forty per cent. of the calves did

[10] *Ibid.*, p. 279.

[11] Bang, B., *a.* " Measures against Animal Tuberculosis in Denmark," Sixth International Congress on Tuberculosis, Washington, D. C., 1908; *b.* " Studies on Tuberculosis in Domestic Animals, and what we may learn from them regarding Human Tuberculosis," Sixth International Congress on Tuberculosis, 1908; *c.* " What are we to do for the Repression and Eradication of Tuberculosis in Cattle," International Congress on Cattle Breeding, 1923 (reprinted in *Bernhard Bang, Selected Works, op. cit.*, pp. 461-498, 520-539).

[12] Bang, B., " Congenital Tuberculosis in Calves," translated from Maanedsskrift for Dyrlaeger, *IV*, 1892-93 (reprinted in *Bernhard Bang, Selected Works, op. cit.*, pp. 288-298).

—demonstrating again that the number of reactors in a mixed herd increases with age. He isolated the reactors from non-reactors and used entirely separate stables, stable-hands, and grazing areas for each group, even though he did not consider such a complicated arrangement necessary for smaller farms. The animals were retested yearly and a few reactors were found in the non-reacting group and had to be transferred. Bang attributed this to inevitable breakdowns in the isolation techniques. However, by 1907, fifteen years after he began to change this infected herd into a wholly-healthy herd, not one of the 211 animals reacted.

Bang, with a missionary zeal, publicized his plan and its results at many scientific congresses.[11] It was tried generally and enthusiastically, with excellent results in small as well as large herds of cattle. The overall figures in Denmark give some idea: in 1894, of 8400 animals tested, 40% reacted; in 1907, of 22,000 animals tested, only 9.8% reacted. The method was quite economical but it was also laborious and required a number of years for its success, and over the years there was a falling-off in its use. Nevertheless, the method was again revived in the 1920's, as Dr. Bang noted with gratification in a talk at the International Congress of Cattle-Breeding in 1923. He pointed out that his method placed the responsibility for eradicating the disease on the cattle-farmer himself, rather than on the state. In the United States, by contrast, the system had developed of the government's paying the farmer to slaughter all reacting animals. Dr. Bang considered this wasteful.[11a]

One other bacteriological discovery of Professor Bang should be mentioned: that of the necrosing bacillus in swine, in 1890. Here again he gave careful pathological as well as bacteriological descriptions of his findings.[12]

Besides Professor Bang's laboratory studies, his interest in teaching was a strong one throughout his active life. He has been called the "life and soul" of the Veterinary College in Copenhagen during the period of its greatest development. His students from many lands were devoted to him.

Bang held many important administrative positions in Denmark, in particular as president for many years of the council which helped to frame legislative measures pertaining to animal diseases. After he retired from the Veterinary College, in 1918, he also did biographical writing which included biographies of Peter Abildgaard, the founder of the College, and

[12] Bang, B., "Über die Ursache der lokalen Nekrose," übersetzt aus Maanedsskrift for Dyrlaeger, *II*, 1890-91 (reprinted in *Bernhard Bang, Selected Works, op. cit.*, pp. 48-70).

of contemporaries such as Salomonsen whom he outlived. His enjoyment of and interest in scientific gatherings lasted throughout his life. He attended veterinary and tuberculosis congresses in all the capitols of the Western world. This included two trips to the United States, in 1908, when he gave a special lecture at the Sixth International Congress on Tuberculosis, and again in 1928, at the age of 80. On the latter trip he visited his family in Baltimore and Dr. Theobald Smith at Princeton, and gave a lecture at Cornell. He received several high Danish orders. He held honorary degrees from the Universities of Vienna, Utrecht, Budapest, and Kristiania. He lived quietly but still actively up to his death at the age of 84. Of his three sons, Jacob Henrik, the eldest, became a physician; Oluf, the second, succeeded his father at the Veterinary College; and the third, Axel Frederik Bang, became an electrical engineer in this country. A grandson, Frederik B. Bang, is Professor of Parasitology in the Johns Hopkins University.

Early in life Bernhard Bang chose for his life-motto, " Make yourself as useful as you can." It seems clear that, as his friend Professor Adsersen stated,[14] " his teaching, his literary activity, and not least his indefatiguable efforts to create an interest in the stuggle against tuberculosis, were pervaded by this endeavor."

[14] Adsersen, Vald., ed., *Bernhard Bang, Selected Works, op. cit.*, p. xiv.

THE MEDICAL HISTORY OF THE VETERANS ADMINISTRATION CENTER AT DAYTON, OHIO (1900-1930)

S. WILLIAM SIMON*

After the close of the Civil War the Government assumed the duty of caring for soldiers and sailors who had been disabled in its defense. The Central Branch of the National Homes for Disabled Volunteer Soldiers was established in 1867 by Act of Congress. It is located on the western outskirts of Dayton, Ohio. The first 32 years of the medical history of this establishment were fully covered in a previous study (*see* reference 6).

Of the 6,930 men cared for at Central Branch in 1900, 166 were veterans of the Mexican and prior wars, 6,739 of the Civil War, and 25 of the Spanish American War. Alcoholism was the most prevalent disease and then followed in order: cardiac hypertrophy and dilatation, chronic gastritis, chronic articular rheumatism and eczema. Among noteworthy happenings was the return of a member from furlough who shortly thereafter developed smallpox. He passed it on to only one other member, however, and the two cases were comparatively mild and ended in recovery.

During 1902, 6,987 patients were cared for with ages ranging from 22 to 88 years, the average being about 65 years. Among the members, several were physicians and of these, four were placed on extra duty as assistant surgeons.

On January 10, 1903, Col. Edwin F. Brown died at the age of 80. He was Inspector-General of the N. H. D. V. S. and was the man for whom Brown Hospital is named. He was a veteran of the Civil War, an officer of the Homes almost from their foundings, and had remained on duty until the last few months of his illness.

The first outdoor tuberculosis hospital ward was constructed in 1904 at a cost of $3000. Arteriosclerosis replaced alcoholism as the most prevalent disease treated.

The first nurses' cottage was erected during 1905. For purposes of administration, the hospital, as was each barracks, was considered as a Company. The hospital adjutant made a morning report, and a muster was rendered on the last day of each month.

* Read at the twenty-sixth annual meeting of the American Association of the History of Medicine, Columbus, Ohio, April 12, 1953.

It became necessary in 1906 to make an addition to the nurses' quarters, to add a wing to the hospital and to erect another tuberculosis ward.

The question of leprosy arose when a veteran of Philippine Service, who carried this diagnosis, was admitted to the Home. None of the leprosaria in this country accepted patients from outside the state so it was necessary for Congress to enact legislation to care for this type of disease.

Also in 1906 in an appropriation passed by Congress it was stated: "No part of this appropriation shall be available except on condition that no bar or canteen shall be maintained at said Homes for the sale of beer, wine or other intoxicating liquors." This met with opposition by all governors and managers and all chaplains except one. Records showed that the beer halls cut the rates of drunkenness, AWOL and other offenses in half over the rates before they were opened and profits from them were used for the benefit of the members.

By 1907, hospital expenses had risen to $75,000 a year. The antiquated heating and ventilating systems were modernized and the nurses' quarters were again enlarged. More offenses were committed by the members of all the Homes than during the same eight months of the previous year. Practically all of these were due to intemperance. The number of cases of acute alcoholism increased in all hospitals from 13% to 91% and again led the list among the diseases most treated.

In 1908, the Surgeon at Central Branch was ordered by the Board of Managers to prepare regulations governing the treatment of cases of tuberculosis in the Home. One member contracted small pox while with his family. He was placed in the hands of civil authorities who cared for him outside the Home.

The salary of the Inspector General and Chief Surgeon was increased to $4000 per year during 1909. Dr. E. W. Elwell who held this office stated in his annual report: "A fair beginning has been made in the organization of the surgeons of the Home into a corps of classified and specially trained officers notwithstanding the fact that there was a loss of 24% of the medical officers by resignation during the year due apparently to lack of sufficient inducements in the service to make it permanently attractive." The number of patients cared for dropped to the lowest figure since 1882—3,704. Varicose veins and dementia were added to the list of most treated diseases. This was the year of the great crusade against flies. For the first time the barracks buildings were equipped with bathrooms.

In 1911, when Dr. Elwell resigned, Dr. James E. Miller was appointed

in his place. A much needed ruling was finally passed to the effect that thereafter all vacancies that might occur on the hospital staff of the Home should be filled by promotion whenever possible.

In 1912, for the first time in many years, the number of patients treated in the hospital fell to below 2000. Thirteen wards had been added to the hospital from its original construction through 1906.

The internationally known Dr. D. W. Green, who had been at Central Branch for many years as oculist and otologist, died on August 16, 1913. He was an exponent of inter-capsular operation for removal of cataract. That same year, the Board of Managers issued instructions prohibiting surgeons from engaging in private practice.

On January 16, 1914, Mrs. E. L. Miller, Superintendent of the General Depot at Central Branch, died. She was over 80 years old and had spent more than fifty of those years in the service of the N. H. D. V. S. at Central Branch. She had reported with the first detachment of members in 1867 and was the first matron. When a Womens' Dormitory was built it was named " Miller Cottage " in her honor.

In 1915, the Board of Managers resolved that Assistant Surgeons would be required to furnish a license issued by some state authorizing them to practice their profession.

1916 was a year of firsts because the first automobile ambulance to be used at Central Branch was purchased, the first " rolling chairs " were purchased, and Assistant Surgeons' quarters were built at a cost of $5000 each. The Surgeon's pay varied from $166.66 to $200 per month with house, fuel and light furnished.

In 1917, the United States entered World War I and two Senior Assistant Surgeons and two Assistant Surgeons resigned to go into Service. They were promised that on their return IF vacancies existed they would be given first consideration.

Several problems arose in 1918. Men received disability discharges from the service and were sent directly to the Homes. Those showing disabilities which were present prior to the service were refused. No consideration was given to aggravation, and on this basis even patients with tuberculosis were turned down. If accepted, according to law, the only criteria used were whether a man was able to make a living and whether his disability was incurred in service.

Apparently until 1919 no physical examination had ever been required of Surgeons, Assistant Surgeons, or nurses, because at this time the Board of Managers ordered these examinations prior to appointment.

In 1920, in the new spirit of improving medical care, the Board of Managers ordered the following: " In order to promote the efficiency of the medical staff, the President of the Board of Managers is authorized in his discretion to temporarily transfer Assistant Surgeons to branches of the Home where proper arrangements can be made for establishing training courses in special lines, and if in his judgment the interests of the service will be promoted, may detail medical officers to attend special courses of training in other institutions." At this time there were three classes of Assistant Surgeons: Junior, Senior and First depending on experience, and of course the pay of each grade differed. Also, at this time, it was decreed that the President of the Board of Managers could grant sick leave with pay " where justified." In the past when a medical officer became ill his pay had stopped.

By 1921, due to War Risk Insurance, more hospitalization was needed for veterans and facilities had to be increased. In previous years the hospital at Central Branch had only taken care of hospitalized members of the Home. Five barracks were emptied of members and established as a new hospital group. A kitchen and mess hall were built connected by runways to these barracks. The capacity was about 450 to 500 patients. In the same year, additions were made to the tuberculosis hospital and three hospital wards were enlarged to be used as a tuberculosis annex. This expansion made it possible to care for more than 1000 hospitalized patients at Central Branch.

The nurses' quarters were enlarged and more than doubled the number of nurses who could be sheltered there. Three more sets of double quarters for Assistant Surgeons were built.

Under the provisions of the Langley Bill $75,000 was allotted to Central Branch for the construction of a 250 bed tuberculosis unit. Expenditures for the hospital including improvements came to over one and three quarters of a million dollars.

Central Branch hospital was considered a modern general hospital caring for every type of patient except nervous and mental cases. It now boasted of 15 resident surgeons, three specialists and 50 nurses. In the selection of doctors the appointments were recommended by the Chief Surgeon based on personal contacts and professional recommendations. They were not under Civil Service but preference was given to ex-service men.

During 1923, the problem of the 50,000 women veterans of World War I arose, and it was decided that they were entitled to the privileges of the Homes and every effort must be made to care for them.

The Board of Managers requested the American College of Surgeons to inspect for recognition the various hospitals of the N. H. D. V. S. as the Chief Surgeon might recommend.

In May the new fireproof tuberculosis hospital was opened.

Up to February 1923, the majority of members were Civil War veterans. But then the scale tipped the other way, and by the end of the year there were 45% Civil War veterans and 55% veterans of the Spanish American War and World War I. Hospitalization of Allied soldiers of World War I was permitted if they were sent by the Veterans Bureau.

Until this time there had been no special uniform for employees, but now it was required that all of those who came in personal contact with patients would wear white uniforms while on duty.

Central Branch now had 1337 hospital beds including the tuberculosis hospital.

On June 7, 1924, by an Act of Congress the benefits of the N. H. D. V. S. were made available to "honorably discharged officers, soldiers, sailors or marines who served in the Regular, Volunteer, or other forces of the U. S. or in the Organized Militia, or National Guard, when called into Federal Service, and who are disabled by diseases or wounds and who have no adequate means of support and by reason of such disability are either temporarily or permanently incapacitated from earning a living."

There were two phases in the care of the disabled. In the first—hospitalization, the objective was rehabilitation. In the second — domiciliary care, the objective was permanent care of those whose hospitalization had not resulted in complete rehabilitation and those who from various causes were incapacitated from earning a living.

In 1925, there were 16 hospital buildings at Ceneral Branch with a maximum capacity of 1165 patients.

In 1926, in spite of the prohibition act there was a noted increase in delinquencies due to the use of intoxicating liquor.

During 1927, a concerted effort was made to place medical officers, nurses, etc. under Civil Service, instead of the entire control being in the hands of the Board of Managers. In addition to their pay, officers were provided with partly furnished living quarters, with heat and light, received 30 gallons of gasoline a month, had free medical service and the privilege of purchasing food supplies at the cost to the Home.

By a decision of the Comptroller General, August 10, 1927, women were held not eligible for care by the Home.

The authorities at Central Branch finally requested that a new hospital

be built there. The old hospital was antiquated and ill arranged for a modern hospital and it was felt that a new building would materially improve hospital facilities and service.

In 1928 the bill was put before Congress for a new fireproof hospital. Congress was also asked to make provision for the retirement of officers and employees who served continuously for a period of time consistent with such provisions incident to service in other branches of government employment.

The new hospital at Central Branch was to have 500 beds and cost one and a half million dollars. To alter the old hospital in order to afford 800 additional barracks beds, would cost an additional half million.

By the Act of February 20, 1929, Congress authorized the erection and equipment of the new hospital. Also during 1929, N. H. D. V. S. hospitals were classified " A " by the American College of Surgeons. Medical officers were appointed by the President of the Board of Managers on proving that they were graduates of a medical college, and submitting letters of recommendation. The Inspector General recommended that the Board of Managers give consideration to the question of providing for the examination of doctors before appointing them.

The site picked for the new hospital was on the old baseball diamond. Five thousand dollars was appropriated for relocating the diamond and moving the grandstand. Plans for the new hospital and the estimates for construction were approved and beds opened on April 16, 1930. The new hospital was called the Col. Edwin F. Brown Hospital in honor of Col. Brown who had served as an officer of the Home almost from its foundation.

By the Act of July 3, 1930, and executive Order of July 21, 1930, Governmental Agencies dealing with veterans relief were consolidated into the Veterans Administration with General Frank T. Hines as Administrator.

In 1930, Civil War veterans comprised 10% of the population, Spanish American 36% and World War I 54%. The average number of members present was 3,340 of which the average sick in the hospital were 813. Among the main causes of death were cancer, cardiac decompensation, hemorrhage, pulmonary tuberculosis, pneumonia, typhoid fever and valvular heart disease. The cost of the new hospital per bed (600) was $2,500. Another 100 beds were put in for necessary employees.

To aid General Hines there was appointed a Federal Board of Hospitalization. Col. C. W. Wadsworth became Director of the Bureau of

National Homes which was the new name of the National Home for Disabled Volunteer Soldiers.

SOURCES

1. Reports of the Board of Managers of the N. H. D. V. S. for each of the fiscal years ending June 30, 1901-June 30, 1919 respectively. Washington: Government Printing Office, 1901-1920.
2. Proceedings of the Board of Managers of the N. H. D. V. S. 1900-1930, Vols. III, IV, and V.
3. Hearings-Appropriations for the Support of the National Homes. 1912-17. 1918-23, 1924-27 and 1928-31.
4. Annual Report of an Inspection of the Several Branches of the N. H. D. V. S. for the years 1925, 1926 and 1927.
5. Annual Report of the Director U. S. Veterans Bureau for the year ended June 30, 1930. Washington: U. S. Government Printing Office, 1930.
6. The Medical History of the Veterans Administration Center, Dayton, Ohio (1868-1900) S. William Simon. *Bull. Hist. Med.*, Vol. XXV: 539 (Nov.-Dec.) 1951.

MEDICO-HISTORICAL NEWS AND ACTIVITIES

ANNOUNCEMENTS

AMERICAN ASSOCIATION OF THE HISTORY OF MEDICINE

TWENTY-SEVENTH ANNUAL MEETING: NEW HAVEN, CONNECTICUT, 6, 7, 8 MAY 1954. HEADQUARTERS HOTEL: THE TAFT. CHAIRMAN OF THE PROGRAM COMMITTEE: DR. LLOYD STEVENSON, UNIVERSITY OF WESTERN ONTARIO, FACULTY OF MEDICINE, 346 SOUTH ST., LONDON, ONTARIO.

NATIONAL NEWS

History of Science Society

The History of Science Society will meet in Baltimore on April 3-4, 1954. The following sessions are planned:

April 3. *Morning Session*, Institute of the History of Medicine, The Johns Hopkins University: Papers on the history of chemistry (Eduard Farber, Herbert Klickstein, Robert Multhauf, Robert Siegfried). Registration and coffee hour will precede this session.

Afternoon Session, Institute of the History of Medicine: Papers on ancient and Arabic medicine (Ludwig Edelstein, Richard Walzer) and on Lavoisier (Denis Duveen).

Dinner Session, The Johns Hopkins Club: "The Role of the Smithsonian Institution in the Promotion of Science in America" (Leonard Carmichael, Secretary, the Smithsonian Institution).

April 4. *Morning Session*, Goucher College Library: Symposium on history of science in the Federal Government (Charles Gant, Hunter Dupree, Nathan Reingold).

Further information may be obtained from Dr. A. W. Richeson, 715 Woodbourne Ave., Baltimore 12, Md.

Chicago

An historical exhibit on infant feeding bottles and medicinal spoons has been arranged by Dr. George Eisenberg and Dr. Louis D. Minsk at the John Crerar Library. The University of Illinois College of Medicine displays material on the history of trephining (*J. A. M. A.*, Jan. 30, 1954, vol. 154, p. 424).

Cleveland

The Handerson Medical History Society was organized on December 14, 1953, at a meeting called in the Cleveland Medical Library by Dr. Henry Fertig, Dr. Howard Dittrick, and Miss Genevieve Miller. The new society was named for Dr.

Henry E. Handerson, one of the founders of the Cleveland Medical Library Association of which he was President from 1896 to 1902. The translator of Johann Hermann Baas' *Grundriss der Geschichte der Medicin* to which he added considerable material, especially on English and American medical history, Dr. Handerson also wrote several extensive articles on mediaeval medicine which reveal a thorough classical education and critical scholarship. His historical collections form the nucleus of the historical holdings of the Cleveland Medical Library.

The first meeting of the Society, with Dr. Clyde L. Cummer serving as Chairman, drew up working plans and decided upon general policies. The Society will be open to all who are interested in medical history in Cleveland and its vicinity, and at least three meetings will be held each year. Dr. Henry Fertig was elected President, and Miss Genevieve Miller, Secretary-Treasurer. After the business meeting Miss Miller spoke on "The History of Medical History," illustrating the subject with representative historical works from the collections of the Cleveland Medical Library and the Armed Forces Medical Library, and Dr. Cummer gave personal reminiscences of Dr. Handerson.

Lectures by Dr. Douglas Guthrie

Dr. Guthrie of the University of Edinburgh will give a series of lectures in this country where he will arrive at Los Angeles from New Zealand. The lectures, among others, will include the Clendening Memorial Lectures at the University of Kansas, March 24 and 25, a lecture before the Johns Hopkins Medical History Club, April 20, and a Woodward Lecture at Yale University, May 5.

Maryland

The Maryland Historical Society sponsored an exhibit on "The History of Medicine in Maryland, 1634-1953," which was on display from November 16 to December 31, 1953. The principal speaker at the opening ceremonies was Dr. Thomas Parran. A pamphlet has been prepared describing the material displayed.

Philadelphia

The Section on Medical History of the College of Physicians of Philadelphia announces the following programs for its meetings in January and February, 1954:

January 29: Samuel Noah Kramer, "Sumerian Medicine: A Clay Tablet Inscribed with the Oldest Medical Inscriptions in Man's Recorded History"; Whitfield J. Bell, Jr., "Adam Kuhn as a 'Suspicious Character'"; Joseph V. Klauder, "Dr. Joseph Bell, Dr. A. Conan Doyle and Sherlock Holmes."

February 25: Robert A. Groff, "S. Weir Mitchell, Neurologist"; Clifford B. Farr and Miss Gertrude Stout, "Review of Letters Received by T. S. Kirkbride, 1840-1883, with Special Reference to Autographed Letters of Psychiatrists"; Douglas Macfarlan, "George de Benneville, Sr., and Early Colonial Medical Practices."

Dr. Samuel X. Radbill is President of the Section and Dr. Nicholas Padis its Secretary.

NEWS FROM ABROAD

Pan-American Congress of the History of Medicine

On the tenth anniversary of the Instituto Brasileiro de História de Medicina and of the Federação Nacional de História de Medicina e Ciéncias Afins, a Pan-American Congress of the History of Medicine is to be held in Rio de Janeiro in July 1955. This decision was made on the occasion of the second Brazilian Congress of the History of Medicine which took place in Recife.

England

The organization of a medical history society, with its first meeting next term, is being planned in Cambridge. It is hoped that one of the functions of the new society will consist in supplementing the activities of Cambridge University which is offering courses in the history of science as a half subject in the Natural Science Tripos.

Germany

The Deutsche Vereinigung für Geschichte der Medizin, Naturwissenschaft und Technik e. V. is planning its annual meeting in Sigmaringen, September 24 to 27. Dr. Gernot Rath, Medizin-historisches Institut der Universität, Bonn (22 C), Germany, is Secretary of this Deutsche Vereinigung.

Netherlands

At the Rijksmuseum voor de Geschiedenis der Natuurwetenschappen (National Museum of the History of Science) at Leyden, an exhibit is being held from Dec. 12, 1953 till Jan. 10, 1954, in honor of William Einthoven (1860-1927) the Leyden professor of physiology, who invented the string galvanometer and developed the technique and science of the electrocardiogram to such a perfection that it became the basis of modern cardiological diagnosis. Einthoven published his invention of the string galvanometer in 1903 and was awarded the Nobel Prize for medicine and physiology in 1924.

Scotland

The Scottish Society of the History of Medicine, through its President, Dr. John Ritchie, and its Secretary, Dr. H. P. Tait, has brought out the *Report of Proceedings* for the Session 1952-53.

BOOK REVIEWS

ERNEST SACHS. *The History and Development of Neurological Surgery.* New York: Paul B. Hoeber, Inc., 1952. 158 pp. Ill. $5.00.

Compressed into slightly more than one hundred pages, this history of neurological surgery barely more than lists the names of the outstanding men who brought recognition to an unknown specialty in medicine soon after the turn of the last century. Before then all was chaos. Egyptian, Greek, Roman, and Arabic medicine hardly produced any worthwhile foundation stones. A few minor pieces came from the seventeenth and eighteenth centuries. Not until the time of Pasteur and Lister was opening the skull a humain and justifiable procedure.

Neurosurgery, an offshoot of neurology and surgery, only began with the work of Victor Horsley and Harvey Cushing. Horsley, a decade before 1900, brought the anatomical and physiological disciplines into the operating theatre, but few patients survived his manipulative technic. Cushing, on the other hand, with a superb surgical background and the finest of technical skills, made craniotomy relatively safe. Leaning heavily on asepsis, intratracheal anesthesia, hemostatic control, wide exposure, gentle handling of tissues, slow, painstaking enucleation, meticulous closing of the wound and watchful aftercare, he soon overcame many of the operative hazards of brain surgery and opened the last of the body cavities, with a circumspection and even reverence that made him a master in the field. Since Cushing's day, further details have been added, but Cushing's approach and his ideals were so sound that, although the subject continually expands, rarely does it rise above the heights reached by him. All this story and more is to be found in Sachs' brief narrative. As a primer the book can be recommended. The style is occasionally halting, sometimes obscure, but the coverage is ample, the references full and the illustrations adequate. To the beginning neurosurgeon, the book should be helpful. To the senior students and historians, fuller texts are available.

HENRY R. VIETS

JOHN FLEETWOOD. *History of Medicine in Ireland.* Dublin: Browne and Nolan, Ltd., Richview Press, 1951. xvi + 420 pp. Ill. 21 shillings.

Ireland possesses a wealth of prehistoric remains, particularly of the megalithic era, and as is natural under the circumstances, is also rich in folk-lore, legends, and the traditions of the far past. In this fascinating history of Irish medicine Dr. Fleetwood first brings us back to the misty far-off days of prehistory. He tells us of the examination of the human remains found in Bronze age burials, which showed that our early ancestors suffered from such mundane diseases as arthritis, mastoiditis, pyorrhoea and bone-abcesses. Other less factual but perhaps more pleasing medical details are gleaned from the ancient annalists, as when in the

Annals of the Four Masters we find a record of the first battle of Moytura, which took place in 487 B. C. between the Tuatha de Danaan and the Firbolgs. Nuadhat, the leader of the victorious de Danaan, was unfortunate enough to lose his hand during the battle: this was sufficient to debar him from succeeding to the Kingship. However, Diancecht, the Irish Aesculapius, fitted him with a new hand made of silver which had been made by Credne, and was capable of movement in every joint. To complete the operation Diancecht's son Miach infused feeling into the hand, which was then indistinguishable from the one he had lost except for the fact that it was made of silver. Unfortunately, Miach's motives in putting life into the hand were not of the best, for he was moved principally by a desire to excel his father. The sad sequel was the murder of Nuadhat by Diancecht from motives of jealousy in the second battle of Moytura twenty-seven years later.

The Tuatha de Danaan, having overcome the Firbolgs, reigned over Ireland for many years, but eventually were themselves vanquished by the invasion of the Celts, who brought their own culture from the East. Their legal code, known as the Brehon Laws, is said to date from long before the birth of Christ, and indeed to be the most ancient in Europe. The Laws were codified in the time of St. Patrick and were not abolished until the reign of James 1.

The tenth century saw the rise of the hereditary physicians; the Dunleavys, O'Callanans, O'Hickeys, O'Cassidys and other families, who practised a system of medicine which was handed down from father to son. These physicians were attached to the families of the various chieftains. Manuscripts which remain such as the Book of Ballymote, the Book of the O'Shiels and many others give details of their theory and practice. Two copies of the Book of the O'Lee's are preserved, one of which is a translation of a Latin text dated A. D. 1434. It is written both in Latin and Irish and forms a complete system of medicine, dealing as it does with skin diseases, systemic infections, poisons, and affections of the brain, eyes, stomach, and womb. Legend states that Murrough O'Lee, the first of the family, was carried to an enchanted isle where he was given this book with instructions not to open it for seven years. He obeyed the instructions to the letter. When at the end of the prescribed period he opened the book he was endowed with magical healing powers and began to practise with great success.

Medicine in Ireland may probably be said to begin with the foundation of Trinity College, Dublin, by Queen Elizabeth I in 1593. The first statutes of the University contain a reference to the courses of study prescribed for students of medicine. It is interesting to note that the modern Trinity medical student still must graduate in Arts as well as medicine before he obtains his degree.

In 1615 Trinity was given a building, originally intended to be used as a Bridewell, which was named Trinity Hall and was used as a residence for students until the Rebellion of 1641. After this period of turmoil the title of the University to the ownership of Trinity Hall was questioned by the City authorities. However, in 1654 John Stearne founded the Corporation of the "President and Fraternity of Physicians" in Trinity Hall, and the Hall was given to Stearne by the Provost and Fellows of Trinity College on the understanding that he would obtain a Royal Charter. This was granted by Charles II in the year 1667, and in this way the Royal College of Physicians of Ireland was formed. The Charter of Charles II,

with some slight alterations, still governs the Royal College of Physicians of Ireland.

The Royal College of Surgeons in Ireland had a different origin. Barber-surgeon's guilds had existed in Ireland since mediaeval times, but for practical purposes the union between barbers and surgeons was dissolved by the creation of the Royal College of Surgeons in 1784, although a Barber-surgeon's Guild continued in existence until 1840, when it was dissolved and its documents deposited in the Library of Trinity College. The Royal College of Surgeons has taken a prominent part in the organisation of medicine in Ireland ever since its foundation. Unlike the English College, it is an undergraduate teaching body.

The Apothecaries, who also can still confer the right to practise, are of similarly ancient and independant origin. Apothecaries are not mentioned specifically in the Charter granted by Queen Elizabeth I to the Guild of Barber-surgeons in 1577, and it may therefore be assumed that they separated from surgeons about the beginning of the 17th century. In 1745 the Royal College of Physicians granted them a Charter to control the sale and manufacture of medicines.

The Apothecaries have gone through various vicissitudes during their history. The present Apothecaries' Hall was founded in 1791, and in 1836 the members of the corporation formed a Company for the purpose of establishing a teaching school, which they built on the site of the ruined Theatre Royal in Crow Street. This building was sold in 1854 to the then newly established Catholic University and the premises were repaired and re-opened as what was commonly known as the Cecilia Street School. When the National University of Ireland was founded in 1909 the Cecilia Street School was incorporated in the medical faculty of University College, Dublin.

As the author says, a visitor to Dublin to-day can be very confused by the apparent multiplicity of universities and medical schools in the city. There are two universities in Dublin. The oldest is the University of Dublin (A. D. 1593), an Elizabethan foundation of one college, that of the " Holy and Undivided Trinity "; the name of the University being therefore for practical purposes synonymous with that of Trinity College, Dublin. The National University of Ireland (A. D. 1909) has four constituent colleges, the University Colleges of Dublin, Cork, and Galway, and St. Patrick's College, an ecclesiastical seminary at Maynooth. Three of these colleges are, of course, outside Dublin, as also is Queen's University, Belfast, which is a separate and independent body.

There are four licensing bodies in Dublin: Dublin University, The National University of Ireland, the Conjoint Board of the Royal Colleges of Physicians and Surgeons in Ireland, and the Apothecaries' Hall. Thus there are in Dublin three major undergraduate medical schools and the smaller Apothecaries' Hall.

Dr. Fleetwood brings us by a long and tortuous journey from the beginnings of medicine in Ireland to the present day, and in spite of the many diverting side-roads which open at frequent intervals, he never goes off the main track for long. One of his most interesting chapters is an account of the Dublin School of Midwifery with which the name of Bartholomew Mosse, the founder of the Rotunda Hospital, is for ever connected. Mosse was undoubtedly a great man and he planned well, for the Rotunda Hospital system has been successful for over 200

years. When he died he was succeeded as Master of the Hospital by Sir Fielding Ould, immortalized in the rhyme:

> Sir Fielding Ould was made a Knight
> It should have been a Lord by right
> For then the ladies cry would be
> "Oh Lord, Oh Lord, deliver me!"

Amongst the ladies who came to him for their confinements was the mother of the future Duke of Wellington.

Many famous names are to be found in the pages of this book. They are not necessarily all medical men. There is a short account of the great philosopher and Divine, George Berkeley, Bishop of Cloyne and Fellow of Trinity College. Berkeley was a very great man in other fields, which may be the reason his prophylactic treatment for smallpox attained such popularity. In 1744 he published a book describing this treatment which consisted in the administration of a pint of "tar-water" per day. Robert Boyle, (1627-1691), the fourteenth child of the first Earl of Cork, was another distinguished layman who had considerable medical interests. His prescriptions are even more bizarre than that of Berkeley.

All the great names of Irish medicine are encountered here. We meet Sir Patrick Dun, the Stokes family, Colles, Graves, Wilde, Dominick Corrigan, and all the other well-known figures. Lesser men such as Rynd, who invented the first hypodermic syringe, and Dease, a founder member of the Royal College of Surgeons in Ireland, are not neglected. Dease it was who committed suicide, it is said, in remorse for opening an aneurysm in mistake for an abscess. According to another account he killed himself when a warrant was issued for his arrest as a member of the United Irishmen. Whatever the reason, he took his life by opening his femoral artery, and it is a curious coincidence that the marble statue to his memory in the hall of the Royal College of Surgeons has developed a crack along the line of the same artery.

The book is well illustrated with interesting and unusual historical prints, one of the most interesting of which is the frontispiece and title-page of *Speculum Matricis or the Irish Midwives' Handmaid* by James Wolveridge, published in 1669. This curious and interesting book is cast in the form of a dialogue between a doctor and a midwife, Dr. Philadelphos and Mrs. Eutrapalia.

Dr. Fleetwood is to be congratulated on this most comprehensive work. He has in a reasonable compass given a well-balanced account of a vast subject, with a wealth of detail and many references. Future historians cannot fail to find his work of the utmost value.

T. G. Wilson

K. D. KEELE. *Leonardo da Vinci on Movement of the Heart and Blood.* With a Foreword by CHARLES SINGER. Philadelphia, London, Montreal: J. B. Lippincott Company, 1952. xviii + 142 pp. Ill. $15.00.

Dr. Keele is a practicing physician with a particular interest in the cardiovascular system, and he has given in this book an essentially complete presentation, in easily comprehensible sequence, of da Vinci's writings on the heart, blood vessels, and blood movement, together with reproductions of almost all the relevant drawings. Da Vinci intended to put his diagrams and notes in order but never, apparently, did so. Dr. Keele, half a millennium later, has carried out the task in respect of a selected portion of the whole, in so far as the extant material allows. The result is a scholarly work of very considerable interest, but probably not of importance in the history of the discovery of the circulation of the blood. For there is only supposition that da Vinci's work influenced the later medical teachers of Padua and through them Harvey, and the latter himself said that it was the disposition of the venous valves—structures unnoticed by da Vinci—that first induced him to think of a circulation of the blood. We must agree, therefore, with Dr. Keele that, while there can be no doubt about the greatness of da Vinci's work on the heart and blood vessels, there is also none about its essential failure.

In what did the greatness consist? The answer is in the degree of combined anatomic and illustrative accomplishment achieved in the circumstances obtaining at the time. Da Vinci discovered parts not mentioned by Galen, e. g., the atria (though he drew the pulmonary veins from the right lung as united with the right atrium), so that the heart was four-chambered; he also gave great attention to the heart valves, particularly the aortic one, and he described and pictured the moderator band, papillary muscles, and coronary vessels; he divided the heart muscles into extrinsic and intrinsic sets, regarded the reversive nerves (vagi) as supplying them, and described and pictured the blood vessels of the adult and of the fetus, though he missed the discoid form of the human placenta. All this was a very considerable achievement on the structural side, but he was less successful on the functional side, for he denied himself the advantages of vivisection, and even the much-quoted experiments on the pig's heart were not performed by himself. Apparently, he never dissected a fetal heart, and in accordance with his physiological ideas he argued that the heart does not beat in the fetus.

In a review one cannot give an exposé of all that is in a book of this length, one can merely direct to the original those who are likely to be interested. To Dr. Keele we are greatly indebted for assembling all the pertinent material, and thereby allowing us to assess more correctly both da Vinci's achievement and his failure to go farther. It is, perhaps, not unreasonable to end with da Vinci's semi-poetic note that the heart " moves on its own and does not stop, unless forever," for that should whet the prospective reader's appetite for more.

KENNETH J. FRANKLIN

AMBROISE PARÉ. *The Apologie and Treatise*, Containing the Voyages Made into Divers Places; with Many of His Writings upon Surgery. Edited and with an Introduction by GEOFFREY KEYNES. Chicago: University of Chicago Press, 1952. xxiii + 227 pp. Ill. $3.50.

For the fourth time in little more than a half century Paré's most characteristic writing, his "Apologie," is again presented to English readers. This reply to his arch-critic, Etienne Gourmelen, not only makes its polemic points in establishing common sense surgery as against the armchair variety, but it portrays with warmth and humor and vividness the personality of the man himself. It is a first class historical source as well, since Paré's keen eye saw and recorded at firsthand some eventful moments of French history, such as the siege of Metz and the battle of Moncontour. All of the "Apologie and Treatise" is reproduced here, with a few corrections of Paré's dates for the journeys, and yet not all quite correctly or fully given: the journey to Landrecies occurred in 1543, not 1544, and that to Flanders in 1569, though no date is given.

The selections from the surgical writings include most of those for which their author is well known: the general description of surgery and its operations, aneurysms, hernia, wounds in general and by gunshot, mummy, amputations, fractures, dislocations, cataract, stone, bezoar, and "How to make reports." The inclusion of the last named is a particularly happy addition, since few are aware of the importance of Paré's contribution to medical jurisprudence in setting forth thus early the necessity for systematic postmortem examination and its reporting. His fame rests first, of course, on his belief that gunshot wounds were not poisoned and could best be treated by soothing applications instead of with boiling oil; and second, on his use of the ligature against hemorrhage in place of the cruel cautery. These matters are duly contained in the excerpts given here, but it is to be regretted that Paré's third great contribution to surgical practice, podalic version of the infant in difficult presentations, has not likewise been included. It would have been well worthwhile to put into English those few epoch-making pages from Paré's *Briefve collection de l'administration anatomique*, 1549, "La manière de extraire les enfans tant mors que vivans hors de ventre de la mère," although the version given by Johnson in 1634 has already been reproduced by Herbert Thoms in his *Classical Contributions to Obstetrics and Gynecology*, 1935.

Four contemporary portraits of the author at various ages are reproduced from his books and numerous woodcuts of instruments and operations after those in the 1634 *Workes*, while the "wound man" on the title-page is taken from the unique Bodleian copy of Paré's *Method of Curing Wounds*, 1617. Format and typography are reminiscent of the author's contemporary publications, even to the inclusion of his marginal notes. An author and subject index form a useful adjunct.

The editor's introduction, addressed to a popular rather than a medical audience, tells clearly and simply the story of Paré's life, with a touch of the historical background of the times. Footnotes and citations have been reduced to a minimum. Paré's own work forms the meat of the book.

It is a disappointment, therefore, to find that the language of these works is not the best that can be had, a faithful English rendering of a good French version.

Instead, the text is reprinted from Thomas Johnson's translation of the *Workes* of 1634, and it perpetuates the latter's faults. This English translation of the surgical books was made from the inferior Latin rendering of the original French: the meaning is often distorted and there are serious transpositions and omissions. Names are inserted which do not exist in the original; dates are misquoted; place-names demonstrate the vagaries of seventeenth century English spelling of foreign words. Many terms are obsolete, unrecognizable, or simply incorrect, while notes explain but few. Altogether, Johnson's translation is not always easy to understand, and often the reader can form only a confused or wrong idea of Paré's sense. The very good translations of the "Journeys" made by Stephen Paget in 1897 or by Francis R. Packard in 1921 would have been more meaningful and rewarding than this one. Likewise, a fresh translation of the surgical excerpts from the French would have provided us with an authentic record of the old surgeon's professional wisdom, in place of the present twice garbled version. The color of the man and of the times might still have been preserved in a readable and accurate presentation of Paré's text.

JANET DOE

F. N. L. POYNTER and W. J. BISHOP. *A Seventeenth Century Doctor and his Patients: John Symcotts, 1592?-1662.* Bedfordshire Historical Record Society, Vol. XXXI. Streatley, Bedfordshire, 1951. xxxiv + 126 pp. Ill. Price: Members, £1 : 1s.; Non-members, £1 : 5s.

In this most interesting pamphlet the editors have marshalled in an admirable way material derived from the case-book, commonplace book of recipes, and a number of letters of one, John Symcotts, a seventeenth century English country physician. From these documents are obtained an insight into the life of a humble general practitioner and something of the state of medical practice in provincial England of that period.

Symcotts, of Sutton, Bedfordshire, studied medicine at Cambridge but how he acquired practical knowledge of his chosen subject is unknown, for, all in all, the facilities for medical education at Cambridge, indeed anywhere in Britain at this time, were poor. Many British students availed themselves of the teaching at Padua, the main continental medical centre, but Symcotts was probably unable to afford the expense of such a foreign sojourn and there is no evidence that he ever left England but ample evidence that he settled in practice in Huntingdon some years before he took his Cambridge M. D. in 1636.

Interesting sidelights are shed on Symcotts' medical reading and the sources of his remedies. Only a minority of his references are to printed books, but a number of English physicians are quoted as sources of recipes copied by Symcotts into his recipe-book. During this period it appears that recipes were circulated by correspondence and even by word of mouth and copied into the recipe-books kept by all medical men, by educated laymen, and by ladies of good family who were especially expected to have practical knowledge of the treatment of common maladies. In this way Symcotts obtained several remedies from Sir Theodore Mayerne whom

he may have met in consultation, probably over the case of Oliver Cromwell. From the ladies of his acquaintance, Symcotts acknowledged many remedies, as well as from his sister, his two brothers, and from a beggar woman in one particular case. He was apparently willing to take recipes from any source save from quacks, empirics, and wandering operators who were then anathema to the regular physicians. These recipes and simple herbal remedies formed only part of Symcotts' therapeutic armamentarium. His methods of treatment were based on the doctrine of "humours" and blood-letting, purgation, vomits, clysters, and the use of issues and setons were his favourite weapons. Frequent reference is made to tobacco and its use in the treatment of haemorrhoids and as an infusion for bathing the eyes in conjunctivitis. Symcotts also used more exotic remedies such as mithridate and theriac, but he was not unmindful of the value of fresh air, diet, and massage.

While retrospective diagnosis is difficult, many cases are clear and many terms still current. Two diseases figure frequently in the papers collected in this pamphlet —stone and gout—and from gout Symcotts himself suffered much. Asthma, agues, the King's Evil and other forms of tuberculosis, dysentery, plague, shingles, retropharyngeal abscess, epilepsy, and melancholia are all easily diagnosed from his clinical records. He describes what was obviously an epidemic of scarlet fever among children under the term "red fever," and smallpox received frequent mention. In a long letter to his nephew, William, Symcotts states that he had had the disease three times himself. Though obstetrics was almost entirely in the hands of the midwife, Symcotts records cases of difficult labour, puerperal delirium, puerperal septicaemia and pseudocyesis, for all of which his opinion had been sought.

Symcott's patients included many notabilities. He records attendance on the St. John family, notable Parliamentarians; Sir Samuel Luke, a Roundhead commander; Dr. John Williams, Bishop of Lincoln and later Archbishop of Canterbury; Viscountess St. Alban's, widow of Francis Bacon, and Sir Thomas Cotton and his family at whose house he probably saw the famous Cotton Library. Oliver Cromwell was attended at least once by Symcotts, who mentions that "Mr. Ol. Cromwell (long since) taking abundance of Mithridate to avoid the infection of the plague, cured his pimpled face; . . . . ." A close association seems to have existed between Symcotts and the Cromwell family. Mrs. Baldwin, first cousin to Oliver, was successfully treated by our country practitioner for what was apparently gallstones, and Anna Carr, second wife of Henry Cromwell, another cousin, sent Symcotts several remedies as well as asking for his professional advice. But the humble folk of the district also received the ministrations of Symcotts, including such as "the poor woman of Fenton," "a little child of John Corbet's," and local merchants and shopkeepers including Richard Powers, a coal merchant of Ramsey, near Huntingdon, with whom Symcotts corresponded.

A useful glossary and very full index increase the value and interest of this pamphlet.

H. P. Tait

HENNIG COHEN. *The South Carolina Gazette 1732-1775.* Columbia: University of South Carolina Press, 1953. xv + 273 pp. Ill. $6.00.

This is the story of an eighteenth century newspaper and its portrayal of men and events in the royal colony of South Carolina. *The South Carolina Gazette* was published continuously for forty-three years and for a great part of that time was the only newspaper south of Virginia. Consequently, its files, largely untapped by historians, are a useful source for students of colonial America. Mr. Hennig Cohen has employed his opportunity to write of the newspaper, its publishers, and newsworthy topics of the time. The result is a book that affords a pleasant introduction to southern social history and early American journalism.

The commercial and cultural life of South Carolina was centered in Charleston, and this volume is primarily the story of that community and its inhabitants as reflected in the pages of the *Gazette*. The story is told in a series of essays depicting professional groups, as well as social activities. Here, among others, are accounts of club life and societies, the theatre, gardens, teachers, artists, books and booksellers.

These titles alone give an indication of the varied lives and interests of the people. Physicians then, as now, were prominent in southern society, providing the author with sources for a chapter on doctors. Here are discussed the varied motives for entering the medical profession of the day and attention is drawn to recognition of the problem posed by lack of regulated medical practice in the colony. Physicians as men of letters are recorded appreciatively, and an impressive directory of doctors is abstracted from *First Notices* appearing in the Gazette. It is pleasing to report that, in addition to the records of the *Gazette*, the author has utilized the writings of Dr. Joseph I. Waring of Charleston, who is doing so much to illuminate the medical history of the colonial South.

At several points, and particularly in his *Introduction* and chapter on *Poets and Essayists*, Mr. Cohen stresses the desire of South Carolinians to identify themselves with the homeland, their yearning for recognition as "Englishmen who only happened to be living in America." This is a recurrent note in early southern history and supports a basic thesis of the late dean of colonial historians, Charles M. Andrews, that these years were English colonial long before they were American or national. That sentiment is the key to the social and cultural mood of South Carolina in the years portrayed. The book can be best appreciated with this in mind.

ROBERT J. FAULCONER

DANIEL DRAKE. *An Inaugural Discourse on Medical Education.* Delivered at the Opening of the Medical College of Ohio in Cincinnati, 11 November 1820. With an Introduction by EMMET FIELD HORINE. New York: Henry Schuman, 1951. xxx + 31 pp. Ill. $5.00.

The Medical College of Ohio was authorized by legislative act on January 19, 1819, but for various reasons its first session did not begin until November 1, 1820. On the 11th of November Dr. Daniel Drake, largely through whose efforts the College was founded, delivered the Inaugural Discourse. In this address he set forth the reasons for bringing the College into existence, outlined the course of study contemplated and described in some detail the relations of the various subjects in the curriculum. He stressed the need for a sound preliminary education and urged the study of the classics in the following language:

"So deeply impressed are the Faculty of this institution with the neglect of these studies, and the importance of them to the advancement and elevation of the profession, that they have offered an annual prize medal for the best inaugural thesis in the Latin language; and hope by this measure to excite among the students of the west an emulation for excellence in classical literature."

Concerning the advantages possessed by Cincinnati as a site for a medical college he said, "Of the numerous towns which have been built in this region, not one seems to me so proper for such a school, as Cincinnati. Its better geographical position, and more intimate relations with the western country generally; its more numerous population, and above all, its greater necessities and facilities for the establishment of a permanent Hospital, designate it as a spot peculiarly fitted for the erection of a medical institution."

Drake advocated the erection of a Hospital to be used for the care of indigent, and by the Medical College as a teaching center, stating that "it is in hospitals that the lectures on practical or clinical medicine must be delivered."

While recognizing the lack of physical equipment and library facilities, Drake felt that these deficiences would be overcome, and that the Medical College of Ohio would confer great benefits on Cincinnati and the surrounding territory. He therefore appealed for public support.

Dr. Horine, who has made extensive studies of the life and time of Dr. Drake, is justly regarded as the authority on that subject. He has contributed a splendid introduction which gives a description of the medical education of the period; notes the early history of medical schools in the United States, and narrates in some detail Drake's life and activities as a medical educator.

The book will be of great value to those interested in the history of the Ohio Valley or in medical education.

DAVID A. TUCKER, JR.

ESTHER GASKINS PRICE. *Pennsylvania Pioneers against Tuberculosis.* With a preface by RICHARD H. SHRYOCK. New York: National Tuberculosis Association, 1952. 294 pp. Ill. $5.00.

This book tells the story of an epic event in the history of tuberculosis, the advent of the volunteer society as a force, and ultimately powerful one, in the fight against the disease. Impressive in its extraordinary documentation, it unfolds in highly readable fashion the story of a crusade instigated by a Pennsylvania physician, himself a victim of tuberculosis, Lawrence F. Flick, to have the contagious disease treated as such, with the usual measures for repression of a transmissible ailment. The story has all the dramatic elements of an account of any bitter fight, and the reader has the added satisfaction of seeing the final triumph of a group of high minded idealists over tremendous opposition. These were the "Pennsylvania Pioneers," and the medium through which they won their fight was Flick's creation, the Pennsylvania Society for the Prevention of Tuberculosis.

The author, Esther Gaskins Price, is no novice in the exposition of medical progress. She has previously recounted the story of research on Rocky Mountain spotted fever. In writing this book she had the hearty cooperation of the Committee on Archives of the National Tuberculosis Association, and especially of its chairman, Dr. Richard H. Shryock, and its secretary, Dr. Robert G. Paterson. These officers and the rest of the Committee sensed an urgent need for the completion of a history of the early Pennsylvania voluntary movement against tuberculosis while some of its chief figures were still alive and able to furnish accurate detail. The result fulfills the hope in a gratifying way. Dr. Shryock, the committee chairman, then Professor of History at the University of Pennsylvania, prior to his assumption of direction of the Institute of the History of Medicine at Johns Hopkins University, has prefaced the volume with an excellent analysis of events in Philadelphia from 1885-1910, which form the subject of Miss Price's book.

In a series of twenty-four chapters in roughly chronological order, a bit disjointed at times but of unfailing interest, the author recounts the story of Flick's origins and reasons for interest in tuberculosis, early collateral work on the disease in Pennsylvania and elsewhere, current medical opinion on its nature, the long fight for its control as a communicable disease, the part played by state and city boards of health, the enormously productive efforts of the volunteer Pennsylvania Society, the founding of sanatoria and facilities for research, the establishment of procedures for health education of the public, the formation of the National Tuberculosis Association, the control of bovine tuberculosis, and the attraction of one of the early great international congresses on tuberculosis to the United States.

Certainly one of the most absorbing of the many interesting chapters is that dealing with the efforts of Flick and his dedicated followers and associates to make the registration of tuberculosis compulsory in Philadelphia. Every student of medicine and public health would do well to read that chapter as a prophylactic against a complacency all too frequent in medical practice. He will see how Weir Mitchell, Jacob DaCosta, William Osler, and other eminent clinicians, not to mention the influential College of Physicians of Philadelphia, actually held back progress in this important phase of public health. He will see, too, how persistence in the drive for truth finally overcame all opposition and achieved the long delayed reform.

The book provides a stirring picture of the rise of a great force in our society, the volunteer health agency. That is perhaps the central theme of the volume and it is well developed.

Liberal exact quotation of original sources throughout the book and a series of appendices, comprised of fundamental documents, make the book as valuable as a reference work as a monograph on an important subject.

ESMOND R. LONG

The Collected Papers of Adolf Meyer. Edited by EUNICE E. WINTERS. Volume I: Neurology. With an Introduction by Louis Hausman; Volume II: Psychiatry. With an Introduction by Sir David K. Henderson. Baltimore: The Johns Hopkins Press, 1950-51. xiv + 693, xx + 674 pp. Ill.*

Adolf Meyer was a dominant figure in American psychiatry during its ripening period and one of the major influences in molding its current form. His major contributions to psychiatric thought were made in the early decades of the century which, at the time of his retirement in 1941, seemed the remote past. His earlier acceptance of psychoanalytic concepts had been replaced by an irritable annoyance with its premature systematization. His failure to move toward synthesis of his own teachings with psychoanalytic thinking, or properly to fuse the psychobiologic unity of man into the social and cultural environment in which the human develops seemed to be holding back progress. His commanding influence seemed heavy and restrictive. Dr. Meyer was the last Geheimrat in American medicine, and his students, who included many or most of the leading university teachers of psychiatry, could and did readily transfer resentments from restrictive fathers onto his confining, critical, paternal person, whom they, at the same time, revered and admired. His contributions had become so solidly incorporated into the body of medical thought that they were belittled as self-evident: doubts were heard that there had been any substantial original contribution. These volumes leave no doubt of the critical moment of Meyer's concepts to the progress of psychiatry.

Psychiatry is rapidly finding its place in American medicine, contributing an holistic, person-oriented, and melioristic trend to medical science and therapy. Its roots are in both the biologic and social sciences and it has served as the portal of entry for sociologic thinking in medicine. The recent progress of psychiatry has usually been attributed to the assimilation of psychoanalytic concepts. Historically and practically, it is important to note that psychoanalysis has found a place in medical teaching and thinking in the United States that it has not achieved in its European birthplace. In contrast to other countries, American psychiatry was already genetic-dynamic and holistic before the impact of psychoanalysis and it had already found an approach that was useful to the remainder of medicine as a

* The price of the entire edition of the *Collected Works of Adolf Meyer*, which consists of four volumes (vol. III, Medical Teaching; vol. IV, Mental Hygiene), is $30.00. The volumes are not sold individually.

prelude to the development of psychosomatic medicine. The direction taken by psychiatry in America is largely a cultural matter. A new and changing country was not to be bound by the pessimism of heredity and its basic philosophy was pragmatic and instrumentalist. Dr. Meyer, born and raised a Swiss, brought into American psychiatry much of what is distinctly American. (I am told that the Swiss are an eminently practical people.) He was an associate of William James, John Dewey, and Charles Pierce, and their ways of thinking were his way, or became his. He was able to see the place of such pluralistic pragmatic philosophy in medicine and, because of his study of Hughlings Jackson and his appreciation of General Smuts' holistic thinking, he saw how the integration could be achieved.

The basic approach may have been attained without Dr. Meyer, for it seems indigenous. The wheel seems obvious too. I may err in attributing the synthesis to Meyer, for Hoch, Salmon, White and others seem to have thought in rather similar terms. The interplay between contemporaries is difficult to trace. If not the father, he was certainly a combination of accoucheur, preceptor, and goad.

The contributions to neurology and psychiatry assembled in the first two volumes of the Collected Papers can be reviewed in many different ways, but here it seems most appropriate to pay particular attention to the development of influences that led to the synthesis which was so important to the progress of psychiatry.

Dr. Meyer entered psychiatry with a neurologic approach. Psychopathology was largely neuropathology and he was an exceptional neuroanatomist and neuropathologist. The papers reveal his persistent inquisitiveness which led to valuable discovery by painstaking effort. His work on the optic radiations and on central neuritis were significant additions to the field of neurology. However, it is in the "Critical Review of the Data and General Methods and Deductions of Modern Neurology," published in 1898, that one sees his ability to reorganize data into more fruitful form. The "segmental-suprasegmental concept," related to the Jacksonian ideas on the evolution of the nervous system and its levels of integration, brought a more useful and reasonable concept of the functioning of the central nervous system by indicating the evolutionary adaptation through the development of the suprasegmental overlaying of the original segmental system to permit greater adaptability and flexibility of the organism. Practically applied to teaching, through the innovation of making brain models with plasticine, it brought to generations of students a vivid idea of how the brain functions through its anatomy. More significantly, the suprasegmental concepts laid the foundation for the psychobiologic idea that the human organism has evolved so that its total integration is achieved at a symbolic level which is made possible by the unique structure of the human brain, with its areas that subserve speech and the prefrontal regions that permit the higher elaboration of symbolization. The basis for the scientific extinction of the mind-body dichotomy, which had so plagued medicine as well as philosophy, had been established, even if in but incomplete form. It would seem natural that the great interest in the role of symbolization in the integration of human behavior would lead to an interest in aphasia, and the problems of aphasia remained a primary interest and almost a hobby until his death. It was a fortunate interest, for it led to a profound appreciation of the problems involved in symbolization and the pervasive influence of mentation on behavior and physiologic functioning. However,

his summary of the area in the Harvey Lecture of 1910, while indicative of his grasp of the integrative activity of the various centers and tracts as well as his profound knowledge of the work in the field, does not transmit his later, broader thinking concerning aphasia, which never reached publication.

The volume devoted to Dr. Meyer's writings on psychiatry proper is difficult to review by itself. Two other volumes are devoted to his writings concerning medical teaching and mental hygiene and it is in these areas that one can find many of his most pertinent contributions to the advancement of psychiatry. The Collected Papers on psychiatry will be disappointing to anyone looking for reports of investigative work. There is also a virtual absence of clinical studies of patients, such as those which stand out as gems in the writings of Sigmund Freud, and which Meyer could carry out in his neurologic and neuropathologic studies. Here, one finds ideas and concepts which he was only able to place in publication when written for some tangible purpose, such as a report on a hospital, the preparation of a chapter for a textbook, or a review, written upon request, for a journal. Those who knew him well soon found that his obsessive preoccupation with expressing things just right, inclusive of all sorts of reservations and his constant doubting that matters were yet shaped up in a form suited for publication hampered his publication of definitive statements of his views and observations. He was often at his best as a critic and, in his criticisms of the views of others, one indirectly finds expressions of his own ideas. Throughout many of the papers, one can find ample expression of three major contributions to American psychiatry. These consisted of the warding off of the acceptance of Kraepelinian nosology by American psychiatry, with its conceptions of mental illnesses as discrete disorders patterned after the model afforded by general paresis; the early support of the contributions of Freud and Jung with very whole-hearted appreciation of the potentialities for the advancement of psychiatry that arose from Freud's early papers; the refusal to accept a pessimistic viewpoint concerning the etiology and therapy of schizophrenia and the paranoid disorders, maintaining the concept of the illness as a habit-deterioration with insistence on interest in the dynamic importance of the psychogenic material.

The refusal to accept Kraepelinian nosology and conceptions derived from his clinical experience, which indicated that patients just did not fit into the categorizations of Kraepelin; from his dislike for the implied pessimism; but largely because it failed to utilize material which was obvious from the genetic-dynamic study of patients. Instead, Meyer conceived of mental disorders as reaction types which, while recognizing the pertinence of constitutional factors, placed the major emphasis on the patterning of personality through life experience. It was not a denial of hereditary factors nor of unknown physiologic factors, but a reflection of his pragmatic and melioristic approach, which insisted that patterns of thinking and living could be modified. The concept of reaction types continues to be a dominant orientation of American psychiatry and psychoanalytic thinking is often modified to fit into this orientation.

It was natural that, with his dynamic orientation, Dr. Meyer should welcome the contributions of Sigmund Freud. His defense of psychoanalysis was an important impetus to the movement in the early decades of the century. Whether his

later antipathy toward organized psychoanalysis arose primarily from his refusal to accept the more formal structure that entered into psychoanalytic thinking, or from feelings of personal rivalry, certainly cannot be determined from his writings. With a focal interest in schizophrenia and paranoid states, Freud's analysis of a case of chronic hallucinatory paranoia in 1896, as well as the analysis of the Schreber case, served as a stimulus which furthered his own considerations of schizophrenia as a type of personality disorganization. Historically, Meyer's persistent interest in the dynamic genesis of schizophrenia, and his insistence that schizophrenic patients could be treated psychotherapeutically, had a profound effect upon American psychiatry. In a sense, Dr. Meyer's tenacious interest in the study of schizophrenia in all its aspects countered the general pessimism and the purely organic or hereditary approaches which held a firm grip on German psychiatry. It is surely due to his influence, later augmented by the work of Harry Stack Sullivan and Frieda Fromm-Reichmann, that the Baltimore-Washington area has been a focal point for efforts to treat schizophrenia by psychotherapeutic means.

These volumes contain material of considerable interest to the medical historian. The first portion of the second volume includes reports and talks given about the hospital and the hopes that Dr. Meyer held for the advancement of mental hospital care and for psychiatric teaching. When he became Director of the Henry Phipps Psychiatric Clinic, he achieved a dream of having a teaching and research psychiatric hospital which was an integral part of a medical school and a university teaching hospital with all necessary facilities for research, but also in which the psychiatric wards and the outpatient clinics could be instruments for research. His vision was broad and his energy was sufficient to turn vision into reality. The scholarly nature of his writings and his comprehensive knowledge of the literature enable the reader to regain the status of the field at the time he was reviewing it. For example, the reviewer found that current thinking about schizophrenia and allied problems is greatly clarified by Meyer's reviews of how earlier concepts took form.

These volumes are naturally of great moment to the psychiatrist who, for the first time, is enabled to follow the development of Dr. Meyer's contributions to neurology and psychiatry. When, at some future date, efforts are made to trace the development of dynamic psychiatry, these will be critical source books, for, even though the lesser genius, Meyer was one of the two great figures who changed psychiatry into a dynamic science that affords useful understanding of human behavior.

THEODORE LIDZ

N. S. PAPASPYROS. *The History of Diabetes Mellitus.* London, 1952. xv + 100 pp.

Dr. Papaspyros has dealt with the history of diabetes from a chronological point of view, summarizing certain aspects in separate chapters. Having narrated the clinical knowledge of diabetes up to the end of the 18th century, he reviews shortly the history of metabolism and of the pancreas. Then he turns to a consideration of the treatment of the disease climaxing in the discovery of insulin and its various

preparations. Ten more pages are devoted to surgical treatment, experimental diabetes, and a few additional data; the booklet ends with a bibliography and indexes. It is altogether a short book. The data marshalled do not go much beyond what is already known and many important aspects are touched upon very slightly. Nevertheless, a monograph on the history of a disease is always useful, and a handy booklet is welcome. The enjoyment of the reader would probably have been enhanced if Dr. Papaspyros had been able to engage some editorial help for overcoming linguistic obstacles. As it is, the author's obvious enthusiasm for the history of medicine will have to substitute.

OWSEI TEMKIN

WILLIAM BROCKBANK. *Portrait of a Hospital, 1782-1948.* To commemorate the Bicentenary of the Royal Infirmary, Manchester. London: William Heinemann, 1952. x + 218 p. Ill. 25s.

The Medical Historian can learn more from a detailed history of a city hospital than from scores of medical essays, produced in the period covered. The solid block of what appear to be incidents and developments of parochial interest are in reality typical of any such institution and deeply bound up with the economic growth of town and country. This is amply borne out by the present work. It is sumptuously produced and its illustrations include a few of more general interest, for example a ducking stool to which scolding women could be strapped for immersion in a pond. Another such picture illustrates the scene of the Peterloo rioting of 1819 which involved the hospital in a campaign of allegations and denials. Illustrations of wards, rooms, theatres before 1908 would have added to the general interest of the book but are not provided. In 1795 Dr. John Ferriar details in a minute the outbreak of fevers due to crowding and other detrimental arrangements inherent in the lay-out of newly built streets and houses. Licensing and inspection of lodging houses, provision of nurses, proper ventilation and cleaning of mills and factories, in short, a public health service was then created in close connection with the infirmary. By 1802, 50 years after its foundation, the infirmary had nursed 157,000 patients. In this year 705 patients had been admitted and the mortality was 7 per cent. 3,470 had been treated as out-patients and 2,243 as home patients. A total of 680 were the results of accidents. The annual expenditure had reached £4,000 of which £430 was paid out in salaries. The annual cost of leeching rose from £50 in 1810 to £373 in 1840. It dropped to £94 in 1850 and £16 in 1860—despite substantial increases in the number of beds. As early as 1773 careful injunctions against cruelty to lunatics were recorded.

W. PAGEL

THE BULLETIN RECENTLY RECEIVED *

Walter Artelt (editor). *Index zur Geschichte der Medizin, Naturwissenschaft und Technik.* Erster Band. München und Berlin: Urban & Schwarzenberg, 1953. vii + 398 pp. Ill. D. M. 51.

John R. Baker. *Abraham Trembley of Geneva. Scientist and Philosopher, 1710-1784.* New York: St. Martin's Press (London: Edward Arnold), 1954. xix + 259 pp. Ill. $7.50.

A. C. Crombie. *Augustine to Galileo. The History of Science A. D. 400-1650.* Cambridge, Mass.: Harvard University Press, 1953. xv + 436 pp. Ill. $8.00.

P. Diepgen. *Das Analzäpfchen in der Geschichte der Therapie.* Stuttgart: Georg Thieme Verlag, 1953. 44 pp. Ill. D. M. 4.20. Agents for U. S. A.: Grune & Stratton Inc., New York.

Jaime Jaramillo-Arango. *The British Contribution to Medicine,* Foreword by Sir Arthur MacNulty. Baltimore: Williams & Wilkins (Edinburgh & London: E. & S. Livingston), 1953. xii + 220 pp. $6.00.

Stephen S. Mason. *Main Currents of Scientific Thought. A History of the Sciences.* New York: Henry Schuman, 1953. viii + 520 pp. $5.00.

Charles Donald O'Malley. *Michael Servetus. A Translation of His Geographical, Medical and Astrological Writings with Introductions and Notes.* Philadelphia: American Philosophical Society, 1953. 208 pp. Ill. $3.00.

D'Arcy Power and W. R. LeFanu. *Lives of the Fellows of the Royal College of Surgeons of England, 1930-1951.* London: Royal College of Surgeons of England, 1953. xii + 889 pp. 42 s.

Henry E. Sigerist. *Grosse Ärzte. Eine Geschichte der Heilkunde in Lebensbildern.* Dritte, durchgesehene und vermehrte Auflage. München: J. F. Lehmanns Verlag, 1954. 440 pp. Ill. D. M. 24.

* The *Bulletin* reserves freedom of decision as to publications to be listed in this section.

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